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NEWS IN BRIEF

WP combined with pictures

A NOVEL text storage system combining image storage with word processing is being developed by Correlative Systems in Birmingham in conjunction with Nexos. This uses the screen of the newly-launched Nexos 2200 word processor to display scanned images of documents and ordinary WP text at the same time.

Corrasy, as the UK company is known, already makes image storage systems that use CCD scanners for input and disc or magnetic tape to hold images, which are used mainly in specialist applications such as banking and engineering. General manager George Nunn thinks the new system could form the nucleus of an electronic office, particularly for special task groups in research organisations, civil engineering, or manufacturing, where drawings are much used. It would probably have from three to 10 terminals.

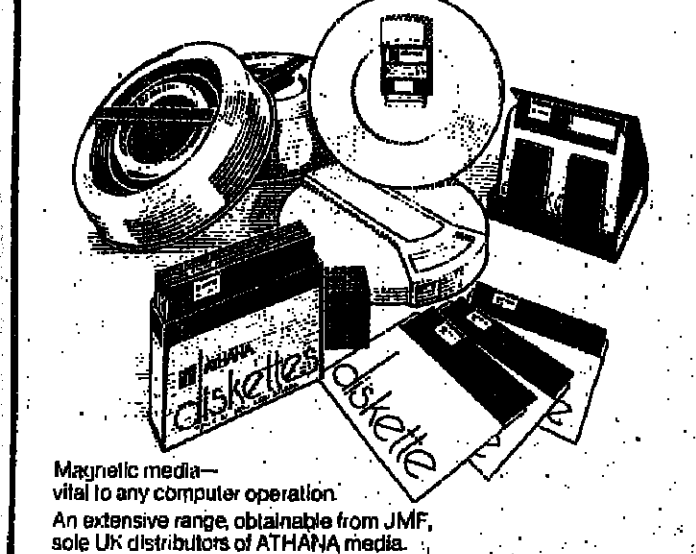
EMI Datel deal

EMI SE Labs has won a contract worth over £1/2 million to produce in quantity two types of wideband modems designed by British Telecom for its Datel 48K leased line data communications service. Type 35 is for installation in customer premises at each end of the link and Type 36 is for British Telecom's repeater stations.

Software addition

A NEW software option has been added to Ferranti's "alternative to the ICL 7502 and IBM 3270," the P17 Programmable Terminal System. The addition is a File Handling Terminal Package, FTP which builds on its predecessor, ITP Interactive Terminal Package, to give local disc handling with indexed sequential, random and serial files. It is aimed at such areas as order entry offices and stores.

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Viewdata is Plessey opener

PLESSEY'S moves into the end-user market for office products are finally beginning to take shape, with the development of a combined telephone and compact viewdata receiver, and the announcement that the telecommunications company's long-awaited plans for what it calls the Integrated Office System will be revealed by the end of the year.

ICL small system gets Winchester

IN a bid to link itself with the latest in small systems technology, ICL has signed a deal with Micropolis of Chatsworth, California. From the beginning of next year Micropolis will be shipping its 1200 Series of 8-inch Winchester disc drives for incorporation within ICL's ME29 computer. Launched in March of this year, the ME29 spearheads ICL's effort to capture a portion of the small systems market. It has four basic storage options of which the Module 10 Winchester option is the smallest. The other modules, both fixed and exchangeable discs, are supplied to ICL by Control Data.



Marriage

The marriage of Winchester technology with the ME29 drive will coincide with the ME29 launch because, in the words of an ICL spokesperson, "We hadn't fully analysed the Winchester market at the time."

For all the brouhaha generated by Winchester such as the 1200 Series, Micropolis is still in the early stages of production, having manufactured 1,000 units to date. By the end of next year Micropolis expects to have cranked up to volume production quantities of 100 drives per day, and the ICL order should account for 10% of these.

Both companies were involved in the interface work which involved changes in hardware and firmware. ICL has not specified how many of the drives it will be taking but the contract covers a three-year period.

The 35-megabyte capacity of the 1200 Series will provide an ideal

Pilot installations of Plessey's entry in the Office of the Future stakes are to start in early 1981.

The viewdata set, known as Viewtel, is now complete in its design and Plessey is considering how to market it. Discussions are also being held with British Telecom about how it meets the requirements for Prestel.

A small screen, a handset, and a push-button dialling unit are all combined in one desk-top housing; the buttons are used both for dialling and communicating with the viewdata computer.

Later an alphabetic keyboard and a small printer will be added, and slow-scan television is also being considered as a possible feature. Repetitive dialling is already included.

A mobile terminal intended for use in vehicles, using radio communications, has also been developed. Called the Universal Mobile Communications Terminal, it has a small screen, an alpha keyboard, and special encryption

Virtual processor to bridge Univac gap

USERS of Univac 90 Systems can look forward to a new processor designed to meet their growth needs by acting as a bridge between the current VS/9 operating system and the Series 1100. First deliveries are scheduled for 1982. The processor, the AVP 1100/60, is designed to operate in a multiprocessor environment of the 1100/60 System.

The big advantage of the AVP is that when configured into this system, user programs written for the VS/9 OS can be executed concurrently with applications for the 1100.

H. Glen Haney, vice-president of Univac, foresees that most 1100/60 AVP users would initially run current VS/9 applications, then as DP demands grew the 1100/60 side of the combination would be more extensively used. New 1100 software will provide transaction processing, time sharing services and program development facilities, extending the end user interface of VS/9 to the Series 1100.

Time sharing is supplied by IMS 1100, a new interactive processing system. Incorporated into the command language are distributed DP functions giving a single easy-to-use interface.

An editor, EDIT 1100, has been designed to provide a functional super set of VS/9 EDT, and includes both conventional line editing and full-screen display oriented commands.

The hardware of the AVP is



Pitcher

facilities to make the communications highly secure.

It is intended for use by security patrols in communicating with their bases and obtaining information from databanks. The Swedish police have already placed an order.

Managing director Des Pitcher said that Plessey might well expand this work into providing complete hardware and software systems for the police.

The outcome of Plessey's two-year development work at Beeston, Notts, on an integrated office system is still not clear, but Pitcher affirms it will be based on the PDX digital private telephone exchange, calling it an office computer, not just an office telecomm switch. It will have to include text editing and processing software, which is a new venture for Plessey.

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Cash flow problems slow SRC aid

SUCH areas as telecommunications and microelectronics have benefited quite considerably from Science Research Council grants last year, but cash flow problems led to inevitable cut-backs in a number of sectors, according to council chairman, Professor Sir Geoffrey Allen.

The council's interactive computer facility at Rutherford had, for instance, developed more quickly than anticipated and could therefore take cuts and still maintain planned progress, he said, presenting the council's report for 1979-80.

"The cash flow problems are partly of our own making and partly a result of the recession we find ourselves in. We're tightly stretched across all our areas of activity, but we're confident that we'll be right back on course over the next year or two."

About 23% of the council's budget had gone on the engineering sector with microelectronics getting between 35% and 40% of that amount. Asked why engineering hadn't got a bigger slice of the budget, he replied:

"Industry must put itself back on its feet by means of its own efforts. What we can do is provide a launching pad for people and ideas for them to choose from."

The council's gross expenditure for 1979-80 was £181,074,702.

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IBM CUTS MANUFACTURING COSTS WITH TIGHTER PACKAGING AS ICL BOOSTS ITS MIDDLE RANGE

'No wires' production key to H-series profits

CHEAPER production from radical new packaging is the major innovation of the 3801, first member of the long-awaited H series from IBM. Announced on November 12, the date most favoured by IBM watchers (CW, October 26), the 3801 offers a performance well in excess of 10 million instructions per second using two tightly coupled processors.

IBM aims to maintain profits by slashing production costs through eliminating much of the wiring. It quotes £1.9 million for a 16 megabyte 3801 with 16 channels. But

the price/performance improvement over the 303X machines is not as dramatic as that offered by the 4300 series over medium scale 370s.

Nevertheless, IBM has seen fit to reduce purchase prices on all 303X computers by around 20%, an indication that the smaller H series six mip H series mode will follow.

Amdahl is reacting to the 3081 announcement by immediately unveiling the new top end machine held under wraps in anticipation of the H series launch. Vendors of

the IBM compatible versions of the Hitachi M-200H, which IBM can now match in power albeit with two tightly coupled processors, may have to revise their pricing. But 3081 deliveries will not start until the fourth quarter of next year.

IBM has also announced the 3033 Model Group S, an entry level machine for the 3033 Series that offers field upgradability to the 3033 multi-processors. At £625,000 for a four megabyte system, the 3033 Group S costs only 50% more than a 3031 while

offering twice the power, a further indication of IBM's anxiety to sell off its stock of 3033 processors. Apart from the dyadic design of the 3081 CPU, with two processors sharing the same main memory and operating system, the main new technology feature is the packaging of more than 100 devices with a total of 45,000 circuits on a 33-layer ceramic substrate.

The chip carrying area of the substrate measures only nine centimetres square and replaces a great

● Turn to page 13

High power upgrade for 2956

UP to three times the power and twice the price/performance of the existing ICL 2956 is offered by the 2966, one of two new 2900 series mainframes formally launched by ICL as part of a major package of hardware and software announcements. As expected the other new machine is the 2955. Its features will include support for TME, the ME29 transaction processing system.

Another product expected for some time and now officially unveiled is Concurrent Machine En-

vironment, the microcoded facility for running either of the VME operating systems concurrently on the same machine with DME. It employs the technique known as time slicing (CW, April 17) and will be available on the 2946, 50, 55, 56 and 66 but not the 2960. ICL wants 2960 users to move to the 2972 and away from DME.

Along with CME, ICL is offering a facility called Adram 1900 which enables VME programs to read and write data from 1900 DME files.

The package of announcements also includes some of the extra promised facilities for Information Processing Architecture (CW, July 31), an entry level version of the VME/B operating system called VME/B-E, and a new version of VME/K, KSV 18, which offers support for CME and the new IPA facilities.

The 2955 is based on the 2946, the machine quietly introduced by ICL earlier this year. A 2946 can be field upgraded to a 2955 with the addition of some extra

microcode. A version of CME called CME/2 will enable DME/2 or 2904 users to start developing new applications under VME/K. ICL points out that the support for TME on the 2955 will enable users to build networks of ME29s linked to a 2955 with the help of IPA.

ICL says that the 2955 offers about 20% more power than the existing 2950/20 and quotes a price of £340,000 for a system with one Order Code Processor, one Device

● Turn to page 13

Copyright furore that never was

ANOTHER promising test of software copyright law has fizzled out before even reaching the courts. Chris Gary of Compshop in Barnet has given a voluntary undertaking not to market or distribute a version of the firmware debugging and editing Toolkit for the Commodore Pet.

Gary, who has been in hot water before over price-cutting (CW, August 28) and marketing an unauthorised cheaper version of Clive Sinclair's ZX80 (CW, June 12), received a letter from the solicitors of Zynar, the Toolkit's distributors, on Friday. He replied with a telex which agreed to abide by Zynar's requirements, adding: "In no way does this constitute an admission of guilt."

Zynar was poised to serve Compshop with an injunction on Monday when Gary's hasty compliance made it unnecessary.

Close eye

The Toolkit copy had come to their attention through the Pet newsletter Printout, and for some weeks Zynar kept a close eye on Compshop.

Zynar obtained a copy of Compshop's Toolkit to establish whether or not it was pirated. A careful case against Compshop was then pieced together, culminating in the solicitor's letter on Friday. The Toolkit is a firmware ROM

which plugs in to one of Pet's spare sockets to enable editing and debugging. It was originally written by Restar in the US, and was adopted and sold by ACT-Microsoft in the UK.

Amicable

ACT-Microsoft ceded the Toolkit agency to Zynar in an amicable agreement earlier this year, after Zynar's parent, multinational Rank, decided to move in on the micro market by financing Nestor Systems' Apple ClusterBus.

In an agreement by which Zynar undertook the exclusive marketing of Nestor products in West Europe (CW, August 2) Uxbridge-based Zynar acquired the Toolkit, which had been a Petsoft top-seller.

Zynar's Colin Crook explained that he was trying to protect the company's investment in new developments as much as the existing Toolkit, which being implemented on ROM has always been vulnerable to piracy, and now has competition from other candidates for the spare Pet socket.

"I'm not going to tolerate copies of our products in Europe, and so we built up a cast-iron case against unauthorised 'trading'," he told Computer Weekly.

He added: "I'm damned if I'll

BRIEFING... BRIEFING... BRIEFING

UK invests £327m in micros

THE UK has committed the most of all EEC countries to the support of microelectronics by investing £327 million for manufacturing facilities, applications and education, according to an International Labour Organisation study. In total EEC members have committed £900 million.

New Minister

THE French government has appointed a new Minister for Telecommunications. He is Pierre Ribes, 61, a political science graduate and member of the French parliament since 1968.

Personal push

JAPANESE exports of personal computers into EEC countries have risen from almost zero last

year to over 1,000 units a month for the first nine months of this year. Already one company, Sord Computer Systems, has received a warning from France to restrain its exports, or restrictions could be imposed.

Control of Rand

SIA Computer Services, the UK subsidiary of the French CISI Group, has bought a 75% shareholding in Rand Information Systems. A software and system conversion group, Rand has 30 staff.

\$100 for Italians

THE IBM 8100 distributed processing system is being used for applications being developed by two large Italian organisations - Alitalia, the national airline, and the social security organisation, Istituto Nazionale Previdenza Sociale (INPS).

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'Close to ultimate' CMOS venture in the pipeline

EUROPE is to get its first source of the 'close to ultimate' technology, oxide-isolated silicon gate CMOS, from a joint venture in the UK between Rael Microelectronic Systems of Reading and General Instrument Microelectronics in the US.

Silicon gate CMOS features extremely low power consumption and high speed of operation and is superior in performance to the more commonly used metal gate CMOS.

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custom LSI and VLSI devices which could have preference over the microprocessor in terms of both speed and density.

With Rael's uncommitted logic array, ULA concept and specially developed computer-aided design equipment and packages, companies could eventually obtain custom VLSI silicon devices within a few days.

The two companies, working closely with the Leuven University R&D unit in Belgium, have al-

● Turn to back page

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COMPUTERVIEW

ICL holds
the line

GIVEN the choice, ICL would no doubt swap the BCS award pinned last week on its current addressable file store system for an assurance that CAFS will be used for the next big public sector order in the offing - this one for British Telecom.

The telecommunications arm of the Post Office needs a high speed information retrieval system for the UK telephone directory assistance service, Directory Inquiries.

It will be employed by 8,000 telephonists working in 260 inquiry centres all over the country serving Britain's 17 million telephone users. The centres deal with an estimated one million inquiries per day.

An indication that it is favourable for the contract would allow ICL fears that British Telecom may go for IBM, GEC or Computer Consultants Incorporated, all of whose equipment is under current review.

This is despite the fact that Telecom has already tried CAFS with a great deal of

success at its Leeds and Leatherhead inquiry centres. Trials ran there for a year from November 1978.

British Telecom stresses that it chose CAFS as a trial system, and is perfectly willing to point out to anyone interested enough to ask that "it did indeed perform very well" on a small scale level. But, it adds coolly: "We studied the results of the trial very closely before asking the four companies to put forward their proposals."

In truth, this is only what the concerned taxpayer would expect from a public body. But it is clear that ICL has another major battle on its hands for the potential multi-million contract, one apparently tailor-made for CAFS.

It faces especially fierce competition from the IBM Directory Assistance System, which has been sold to a number of telephone companies in Canada and the US.

The battle between these two, with GEC and CCI weighing in, is out in the cold climate of the current market place, unsheltered by single-tender order policies and the like. The policy is soon to run out, but does not apply here anyway since CAFS is not a mainframe and British Telecom, though nationalised is not a government depart-

ment. The outcome of the battle will be a better test than the BCS award testifying to ICL's excellence.

Copyright law

COPYRIGHT, the author's ownership of his work, is something that can be bought, sold - or stolen. While writing and recording rights are clearly protected, the law has not yet caught up with the technicalities of software ownership, despite repeated calls from the industry.

Industry observers were hoping that Zynar, backed by Rank's cash resources, would get into court with a case which would settle for once and for all the indistinct copyright law on software.

But Chris Gary, who would otherwise have found himself the subject of an injunction, has given an undertaking to stop selling what is alleged to be a copy of Zynar's Toolkit, a firmware utility for Commodore Pet programmers which plugs in on one of the Pet's spare sockets.

The Toolkit's implementation on ROM makes it particularly vulnerable to piracy, a disadvantage not helped by the recent Sin-

clair case against Compshop, in which Justice Megarry implied that ROM, being invisible, could not be considered a copyable.

Zynar took the precaution of building a case on several grounds; since the shifting sands of software copyright make for a dangerous path to be picked out between ad judgments.

Other recent litigants have also hedged their bets: Sinclair won his injunction on the similarity of keyboard, and Graham Down Software is currently pursuing an alleged theft of source code on the grounds of "conspiracy to defraud".

However, the Kansas City Systems case recently indicated a change of heart by the law: although settled out of court the case did get as far as an injunction, given by Justice Graham on the grounds that software copyright was infringed.

The implication that there is such a right protecting software is encouraging, as is Zynar's assertion of rights over the Toolkit. But it is not enough; it is high time the spirit of the law was given substance by the issue of it, either through a decisive case, or, better, through a specifically worded Bill to protect the British software industry.

LETTERS to the EDITOR

Plaid Cymru
alternative

THE CW Recruitment Special (October 30, 1980) provided room for Tory, Labour and Liberal Party views on developments in the computer industry.

It might interest you to know that there are other political parties in Britain, and indeed parties with parliamentary representation, which have considered policies on this subject.

This year Plaid Cymru devoted its annual summer school to the twin issues of energy and new technology. Lectures explaining the implications of growth in new technology were given by a number of invited guests. Members of Plaid Cymru have indicated that it is necessary to make a positive response to the challenge of new technology.

Plaid Cymru is deeply concerned with the horrific decline in employment opportunities which has occurred in Wales due to the axing of jobs in traditional and basic industries. At its annual conference on October 22-25, Plaid Cymru declared its strong opposition to the policies of the present government but also stated clearly its position on the question of new technology.

In a comprehensive motion on

employment, the conference demanded that "the maximum growth of employment opportunities in Wales be achieved through differing uses of new technology". Such a declaration is of direct relevance to the recently announced decision to site the first Inmos factory at Newport, Gwent. But, in recognition of possible difficulties consequent to uneven developments due to new technology, Plaid Cymru advocates "the sharing of wealth produced by new technological processes on the widest possible scale and its use to create socially desirable jobs, in improving the environment and developing housing, education, health and social services".

I hope that the seriousness with which Plaid Cymru approaches the subject of new technology is apparent from the preceding remarks. In these days of growth in information technology, it is to be hoped that there will be a much wider access to political ideas and policies.

Dr K. ALAN SHORE
Penyffordd,
Clwyd,
Wales.

Tom Gilb
replies

D. LINTHWAITE and A. J. A. McLELLAN insist on impenetrable misinterpretation in their letter (CW, October 9) regarding my column of September 11, which introduced the simplification principles I have been treating.

First, I must object that their interpretations of the principles intentionally leave out the distinctions which are clearly in my list. Of course all "simplification" principles say "simplify" in one way or another. In summarising the principles of simplification before treating them in depth, I recognised that some readers would "misunderstand the principles" (CW, September 11) and warned of this at the time. I still feel that there was some service to the reader, particularly if the letter is collected, in giving this preview.

I would hope that Linthwaite and McLELLAN have the grace to feel embarrassed about their public outburst, and want to do us all a more constructive service by making specific references to the principles I have expounded; they are not infallible but are merely practical observations from my limited point of view. Or perhaps they can contribute some policies and experiences in simplification.

Kolbotn
Norway

Turing test of
info creation

IT seems that a debate has been started on whether or not a computer can create information (Michie's Privateview, CW, October 28).

I propose a kind of Turing test. Let us take three cables, leading to three printers. At the other ends of the cables we put Professor Michie, a computer with a pseudo-random number generator, and a truly random source of white noise (based on thermal noise or random radioactive decay). For several hours, or days, we observe the information produced by these three sources and displayed on the printers.

My prediction is that the white noise source will "create" the most information, the computer will come a close second, and the Professor a clear third.

C. G. PERKITT
Tongeren,
Belgium

Taxing systems

"MICROCOMPUTERS in every tax office" (CW, November 6) is only one of the options we discuss in our pamphlet on the computerisation of PAYE assessment. The final recommendation is better described as a mixture of small to medium-sized business systems using the staff, accommodation and communications facilities which the Inland Revenue already have, or could reasonably be expected to obtain in a sensible time-scale.

Since the key arguments will apply with equal force to a number of major government computer proposals likely over the next few years, I should like to remind your

readers that copies of the full text are now available, price £2.50, from the Bow Group, 240 High Holborn, London, WC1V 7DT. I should also like to point out that arrangements can be made for counter-arguments to be circulated to the full membership of the Group, including 22 government Ministers (eight of whom are of Cabinet rank), and 62 in the House of Commons.

PHILIP VIRGO
The Bow Group

TEN YEARS
AGO

From Computer Weekly
of November 19, 1970

ICL, Control Data and CII of France agreed to form a joint study company based in Belgium, to be called International Data. It was intended to broaden and accelerate the three companies' technical co-operation. A plan to computerise BCS members' records was taking shape, and due to be put into practice by May 1971. The practice by May 1971, the first Post Office Data Link in the UK was transmission link in the UK was set up between the Midland Bank and Pudey. The Government expected to have spent about £1.1 million on buying in computer systems and programming support in the year to March 31, 1971, the Parliamentary Secretary for Civil Service told the Commons. The US Navy ordered two CDC 6700s, one 6600 and one 1700s, in two orders worth £1.7 million. The Rutherford High Energy Lab decided on an IBM 360/155 for its upgrade, mostly because of the continuing offer with the lab's 360/75. A plan to set up a joint DP committee to handle the DP needs of both the US House of Representatives and the Senate was scrapped.

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1984 and all that . . .

THIS week's example of the strange things people say in the media about computers was sent in by D. Boyd of Norwich, who wins £5. Times Newspapers, management, after prolonged disruption, informed print union leaders that unless agreement was reached on introduction of new technology - effectively the use of video screen computer operators - but also important reforms in industrial relations, publication of all papers would be suspended by the end of November that year.

The Daily Telegraph

Trade mission out to sell 'Aztec West' to the Americans

TAKING coals to Newcastle? A British team is out in California this month to promote Silicon Valley, Bristol, otherwise known as Aztec West. The aim of this trade mission is to attract further US investment to the 200-acre development site near Bristol.

Aztec, derived from the A to Z of technology, flourished from research carried out worldwide showing that high technology flour-

ishes best where facilities for the good life now, go hand in glove with scope for growth.

ESN, the pension fund of the electrical supply industry, recognises the potential of the Bristol site and bought the land in 1979. Construction is on the modular style to ensure flexibility.

Work started this autumn and will eventually culminate in 1½ million square feet of industrial

space and 500,000 square feet of offices and recreational facilities.

Development is expected to take five to 10 years, and on completion Aztec is forecast to become one of the most important high technology campuses in the world.

Bristol is particularly well suited to industrial projects such as Aztec, with sea and country within easy reach and the nearby universities of Bristol and Bath to act as a

source of skilled engineering staff.

The recent loss of the Inmos manufacturing plant to South Wales was a blow to Bristol hopes, and Mike West, industrial development officer for the Avon area, admitted that manufacturing jobs have been cut from 39% of the total in the early Seventies to 29% currently. Like other parts of the country Bristol needs the injection of 2,000 new jobs in industry.

However West remains optimistic and firmly expects to see the creation of 3,000 jobs over the next two years.

"Three US companies," he said, "are likely to move into the area shortly."

During the last year several large companies - Fairchild Instruments, Marconi Avionics, Sperry Gyroscope and Nexor - have opted for Bristol.

UK newcomer makes
strong entry to
business micro market

A NEW British manufacturer, Trivector Commerce, has made a strong entry into the business microcomputer market. The company's first machine incorporating 64K RAM and 22 megabytes of backing store on Winchester disc, is particularly suitable for expansion to multi-tasking operation.

A common problem with small business systems which have been extended for multi-tasking is the drop in response time.

Trivector's Triton 4 obviates this by providing the facility to add on up to three additional CPU modules. Alternatively, if response time is not an important feature but cost is, then jobs can be run on a time-shared basis with up to four VDUs connected to a single common processor.

Each VDU controller incorporates 32K of memory addressable

in page mode. This ensures that each of the programs associated with a particular VDU is always available in store as opposed to having to be loaded by disc.

Another feature is the back-up of the Winchester by a 12-megabyte cartridge tape. Only two tapes are needed to dump the entire contents of the Winchester, a process which takes about 25 minutes. This compares favourably with systems which have to fall back on a large number of floppy discs for security back-up. The 22-megabyte memory can be increased in steps up to 128 megabytes.

The Triton 4 may be used with any general purpose Z80 software, but main software support is through CAP's MicroCobol under the Business Operating System, BOS.

Price of the basic hardware including an 80 chips 132-column printer is £8,995.

Trivector Commerce is an offshoot of Trivector Systems, a six-year-old Bedfordshire company which has been manufacturing microcomputers for scientific applications. The new company has been financed partly by TC and partly by a £100,000 loan from Barclay's Merchant Bank.



Chris Blake, of Trivector Commerce demonstrates Triton 4 at its launch at Woburn Abbey.

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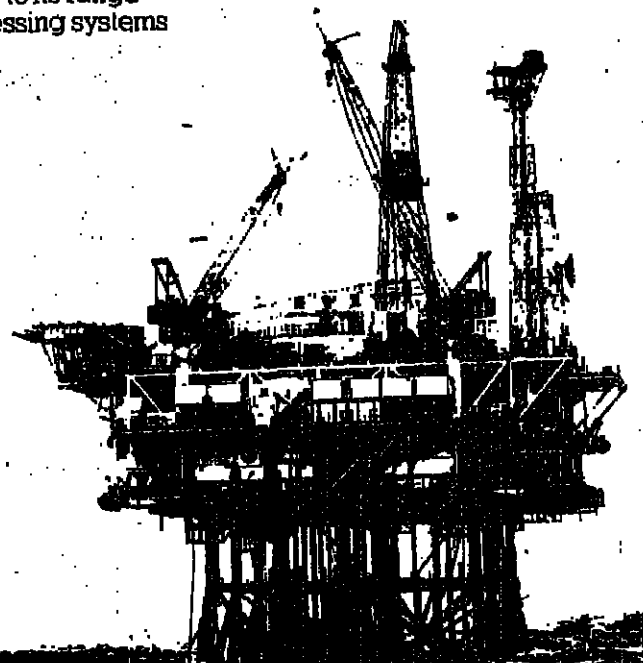
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FOCUS Wrong bus?

THIS year's president of the British Computer Society, Mr F. J. Hooper, has confided that he is worried technology is outstripping the capability of people to cope with its application with the degree of confidence and ability which the Ordinary Man on the Clapham Omnibus has been led to expect.

There is a chance, however, that Hooper and the BCS have been travelling on the wrong bus.

The ability of the non-DP professional to absorb computing technology is a confirmed fact of life. Just who it was who operated the original desk-top accounting machines and minicomputers? Who now operates the small business machines and the herds of Mighty Micros being introduced into non-DP specialist environments?

As the BCS will recall from their earlier involvement in microfairs, far from being hesitant or reluctant to grapple with new technology, society at large appears only too eager to get to grips with computers. Interested parties at such gatherings range from schoolchildren to the enthusiastic businessman, plus not a few hobbyists. The BCS should perhaps take a closer look at the office desk. Chances are that each individual is coping with his terminal, VDU or micro with considerable confidence and ability.

Pace
Hooper went on to suggest that the ultimate emergence of an electronic environment such as the automated office is fraught with danger. Whether office workers see the inherent dangers in the same electronic light is far from certain. Given the choice of manual ledger accounting, cumbersome filing systems and typing comprehensive legal documents, few would demur at the introduction of a micro, an electronic mailbox or a word processor unit into the organisation.

The BCS is not, however, alone in its approach. The NCC has announced that it is to conduct a study to investigate the effects of the new technology on managers' jobs. Maybe there should be a public work-in seminar to reassure the leaders of the computer industry that, far from being uneasy, the average citizen is more concerned with the pace of his Clapham Omnibus than the pace of DP technology.

Oh for the quiet life!

Downtime
by Chad

I OFTEN wonder about this amazing microelectronic world of the future we keep hearing about. Everything will work beautifully and there will be nothing left for us to do, or so we are told. Then I go out into the world and try and do something with electronics, and I start thinking maybe the forecasters live on Mars — they certainly don't live here.

My latest saga goes as follows: I decided it would be nice to have a telephone answering machine — friends keep complaining that I am never in to answer the phone and I convince myself that I am

missing lots of exciting party invitations. So I trundle down the Tottenham Court Road, where there is a glittering array of such devices, and choose one, a GMTC model, which is described as "computer controlled" and is in fact very clever. It is highly automatic: it does all the thinking and fiddling for you and you can even call in from another phone and make it play back your messages to you. Great! So I take it home and there it is, installed by the phone in my study/bedroom.

There the problem appears. I discover

that while it is sitting there waiting for calls, the machine makes a clicking noise. This noise is inaudible in a crowded shop, but at home it is enough to drive you bananas, while you are sitting at your desk trying to work or lying in bed trying to sleep.

So what do I do? I switch it off. Then I go out, forgetting to switch it on again. Or I go to the loo, thinking it will answer the phone and of course it doesn't. Clearly the whole idea is to leave it on all the time; that way you can decide to be anti-social and not answer the phone for a while even

when you are in.

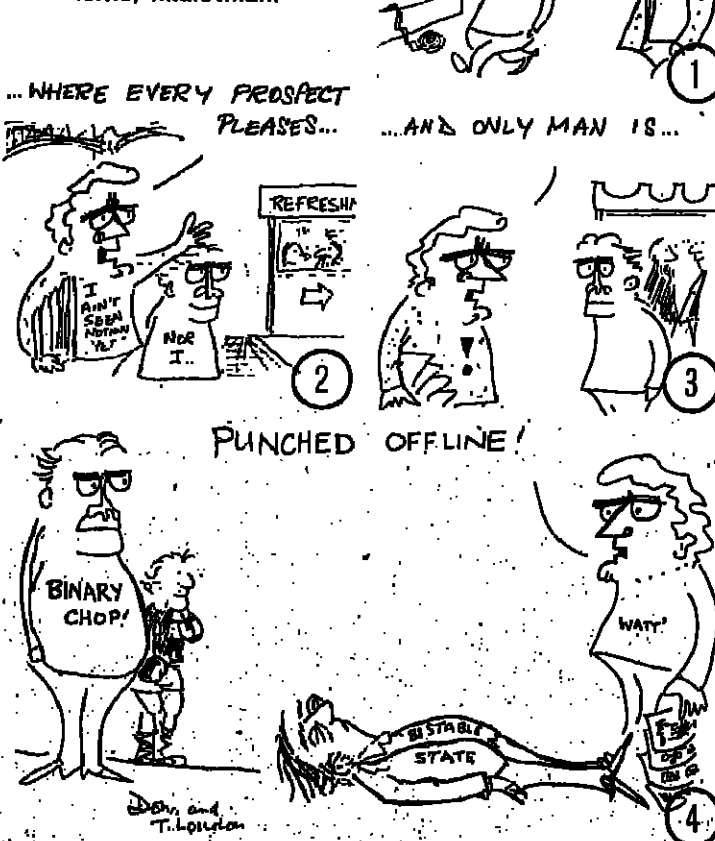
I go screaming up the wall at the idea that this microchip can do all these clever things, but not make it quiet! How could I have thought of this requirement for silence before I bought it? The manufacturer apparently didn't: my machine has no defect.

All these machines make the noise to a greater or lesser extent. So what can be done? Will Chad be granted a happy issue out of all his afflictions?

Wait breathlessly with me to see, dear readers.

Competition 80 Winner

A LARGE, witty and ingenious entry to our Competition 80 (CW, October 28) exercised Don's mind wonderfully, and results in £80 and the signed original of this Liveware File going to T. Loudon, Institute of Geological Sciences, who lives in Salerno, Midlothian.



GILB'S MYTHODOLOGY

Simplify by using two solutions

SOME problem solutions become unnecessarily complicated because we attempt to solve extremely different problems with a single "simple" mechanism or solution. This kind of solution simplification will often lead to hidden additional costs and mechanisms. These additions, often coming after initial implementation have performed poorly in actual operation, are necessary because of the conflict involved in trying to satisfy widely different needs with a single solution.

For the masses
The way to achieve real total simplification is often to have two or more mechanisms: one for each of the widely varying problems. I sometimes design this design principle as: Design for the masses, then design exception solutions for the exceptions. Here is an example: A Swedish newspaper designed a way of uniquely identifying a subscriber for telephone inquiry into questions like: "Why didn't I get my paper today?" They had well over 100,000 subscribers to consider, including lots of Olssons. Some of you would have designed a "subscriber number" of digits, conveniently ignoring the problem of the subscriber actually

finding the number before ringing the newspaper. Some readers might have tried to access the subscriber record by means of name and address, but most would have required a minimum of eight and probably many more characters keyed in, in order uniquely to identify the subscriber.

I am not just guessing at these answers. I have asked a few hundred course participants to solve this problem. Few of us would have come up with the elegantly simple and efficient solution actually used.

The solution makes use of an average identifier keying of about 4.2 characters. Four characters for the "masses" of inquiries, and a fifth depression for exceptions (about 20%). Before you read on, you might like to take a guess at how this was accomplished. The solution uses a three stage rocket, combined with some natural selection of unique identifiers.

First, if the subscriber identified himself as Tom Gilb from Kolbotn, the online terminal operator would key in something like GJ KO. This would give either a unique record, or at least the correct record in a list of similar records on the screen (like a page of Gilbs and Gilberts in a telephone catalogue). Visual operator eye selection can at this stage answer many questions, like: We have stopped delivery because no payment has been received.

Each subscriber on the page is assigned a unique one-character code, and a fifth key depression gives the unique record selection and full record display, which is necessary for certain inquiries and for updates.

There are some hidden principles in this solution. The first is that people calling a large newspaper will normally try to give an identification which will be unique at that institution. If my name is Jones on Main Street, then I know that I must stress that I am Percival C. Jones on 234 Main Street (the operator might key PJ

23 or JO 2M depending on how sophisticated a set of rules you want to use to match against your records).

The second principle is the one that the online terminal operator can be allowed to use his or her common sense to select a few key characters from this information. JO MA (Jones main) is likely to select well, while PJ is likely to select poorly. The operator will normally be more successful. The operator can be given a degree of freedom. We don't have to match against a single unique "right" code.

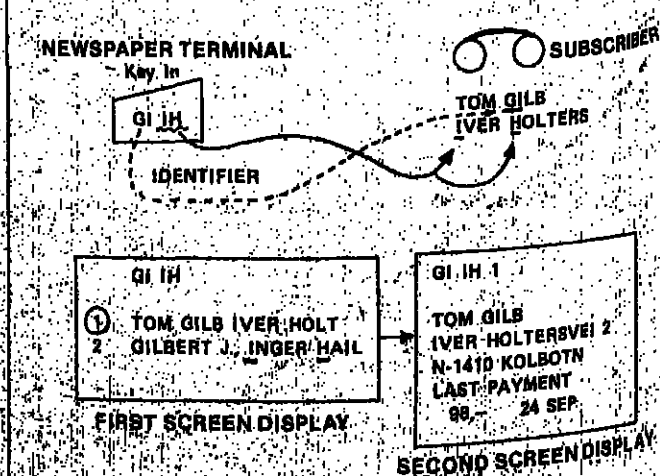
The third principle is that we don't have to access records uniquely by electronic logic alone: it is often sufficient to let the field access be by means of an operator's eye scanning a page.

In addition to these natural selection principles, notice the three-stage rocket: two characters from the name are used to select (1/900th of file) a "page" of subscribers with similar names. Then stage two, the next two alphanumeric characters (roughly 40 x 40 combinations, or at best another division into 1/1600th potential) are used to select one or a few of the subscribers on that "page" (for example "GJ") page. Finally, a character (very exceptionally two) is used to select, if at all necessary, in order to answer the enquiry, a unique subscriber record.

More perfect

A fourth hidden principle is that the design here uses information which is natural for the exceptions (the name and address listed or delivered to, which the paper and the subscriber must normally know). Naturally we did not simplify the programming or the data here. We simplified the human work process at both ends of the system. Sometimes simplification is a matter of your priorities: "where will simplification pay off the most?"

Hypothesis: Systems that are made more perfect if we don't try to make them completely perfect.



Toshiba launches 16-bit SOS micro

JAPANESE company Toshiba has announced a 16-bit microprocessor based on silicon-on-sapphire technology. This means that both GEC and Toshiba are continuing research and development in SOS, even though Hewlett-Packard, the only manufacturer previously to have concentrated in the area, has opted out of advanced research (CW, September 18 and October 9).

The T88000 uses a 10MHz clock with gate delays of around 0.7 nanoseconds and operates five times faster than MOS processors like the Intel 8086 and Zilog's Z8000. The high speed is obtained

with line widths of 3.5 microns. With MOS techniques line widths of 2 microns would be needed to achieve the same sort of speed.

Pipelining

The device has about 12,000 gates, and with the bigger line widths, the whole chip area is larger than normal, around 50mm². Speed is not the only advantage that SOS has over bulk silicon: power dissipation is about a quarter of that of a similar bulk silicon device, about 700mW.

Two parallel 16-bit buses make the processing speed twice that of a single bus and the T88000 has a pipelining ability, which also speeds up processing. While one instruction is being executed, another is fetched, thus saving time.

The data bus has a 32-bit input/output structure and the T88000 can address directly 16 megabytes. A 16-bit by 16-bit hardware multiplier increases the execution speed of multiplication to around 1.6 microseconds, or four machine cycles. This compares with up to 100 machine cycles for software multiplication.

Russians catching up with US in microelectronics

FROM behind the Iron Curtain emerges a microprocessor which, at the moment, is only three years away from current US standards in the design and production of microelectronics. The gap was thought to be at least ten years.

Control Data in the US has obtained through Hungarian sources a Soviet microprocessor similar to the Intel 8080A 8-bit single chip microcomputer. Experts at Control Data say that the Soviet device, the K5801K80.77, is a genuine production device probably using the Intel part as a model.

It seems that new photolithographic masks have been developed, as experts say the line widths are larger than on the Intel chip. This is thought to have been done at Zelenograd, 90 miles north-east of Moscow, known as the "Silicon Valley of Russia".

The Russians have also used more robust packaging indicating the harsher industrial environment in which their microprocessors are used. The device is housed in a stronger, more reliable ceramic flat pack.

The Intel 8080As were bought legally from Munich

by Videoton, a Hungarian national computer company, which has had a long-standing trading relationship with Control Data. The company specialises in producing data terminals for the Soviet Rjad line of computers.

Videoton indicated to Control Data that if and when it decided to put the terminals into production it would not use the Intel part, but a Soviet copy of it. It then gave Control Data a sample.

Soviet computer output last year was thought to be worth about \$6 billion. This is the size of the US computer industry without IBM.

The Intel 8080As were bought legally from Munich

TELECOMMUNICATIONS USERS' FIRST CONFERENCE

'Information technology vital if UK industry is to compete'—warning

IF UK industry is to keep up with its competitors abroad, it must cut office overheads by investing in information technology, the Telecommunications Users' Association heard last week.

Speaking at the TUA's first conference, British Telecom deputy managing director John Harper said that the potential for exploiting telecommunications was enormous and the Germans, Swedes, French and Americans had seen this already. It was a disgrace, he said, that more people did not know about electronic offices.

United

British Telecom was not an enemy to users, Harper said it was a servant which did not feed shareholders but tried to optimise the running and finances of a network which belonged to the community. Any excessive profits were returned to users.

The new situation created by impending legislation on the monopoly united more than it divided British Telecom and its users, and the package of services being prepared would create a need for co-operation rather than for debate.

The government had approved 85% of BT's investment requirements for this year, replacement of Strowger exchanges in London was halfway through, and waiting lists for the supply of private lines in London had been reduced for the first time in many years.

Private circuits on order had peaked in August, but had then turned down and now stood at 21,370. Exchange lines waiting

had been reduced from 125,000 in May to 108,000 now, and telex lines from 5,600 to 5,300. Lead times on delivery of telex lines was now 10 months, but it was planned to reduce it to three months by next September.

Many delegates were worried about the thriving trade in illicit telephone attachments now going on. Harper said British Telecom had soft-pedalled its response so as not to appear to oppose the ending of the monopoly.

When a subscriber had been found using one, for example when it caused a fault on the line, he had been informed it was not a permitted attachment and usually he disconnected it voluntarily. If the subscriber told the engineer to "get stuffed," the policy was now to disconnect his line.

Danger

The biggest single danger to the revenues of PTTs in all countries was from the carriage by private companies of third party traffic internationally. There was concern about this up to CCITT level, Harper said.

Department of Industry telecommunications head Bill Wigglesworth said international services were subject to international agreement and he knew of no approaches to CEPT, the committee of European PTTs.

Telecoms trading is discussed with EEC

TALKS have begun with the EEC Commission and foreign governments to prepare for reciprocal trading in telecommunications products and services when British Telecom's monopoly is ended.

Opening the Telecommunications Users' Association conference, the new Information Technology Minister, Adam Butler, said that the GATT agreement and the EEC regulations on free trade should allow scope for reciprocal trading agreements.

Imports would not be encouraged where there was no reciprocal arrangement; the government was not throwing open the gates to international manufacturing competition in one doctrinal gesture.

The government's aims in dealing with the monopoly were to ensure the best possible telecommunications service to business and the general public and to stimulate industry to exploit to the full the opportunities presented by information technology. It supported British Telecom's plans to invest heavily in its network and was fundamental to the continued growth of information technology. There might be some scope for

competing transmission systems, for resale of capacity on British Telecom's networks and for third party alternatives to British Telecom's network services.

Professor Michael Beasley, of the London Business School, has been commissioned to study these issues, because although profit-making might undermine the preservation of a widespread service, a rapid increase in traffic might justify the competition. The theoretical maximum was total freedom.

Construction service

CMG (West End) has formed a division to deal with computer services for the building and construction industry. The division's services will include assistance with selection of computers, the provision of bureau-based facilities and the development of specialist systems.

The copyright furore

From front page

put up with that sort of rip-off. This situation is very bad for the UK software industry — it's disadvantageous to the development of the trade."

Chris Cary is away in Ireland for two weeks, but a spokeswoman for

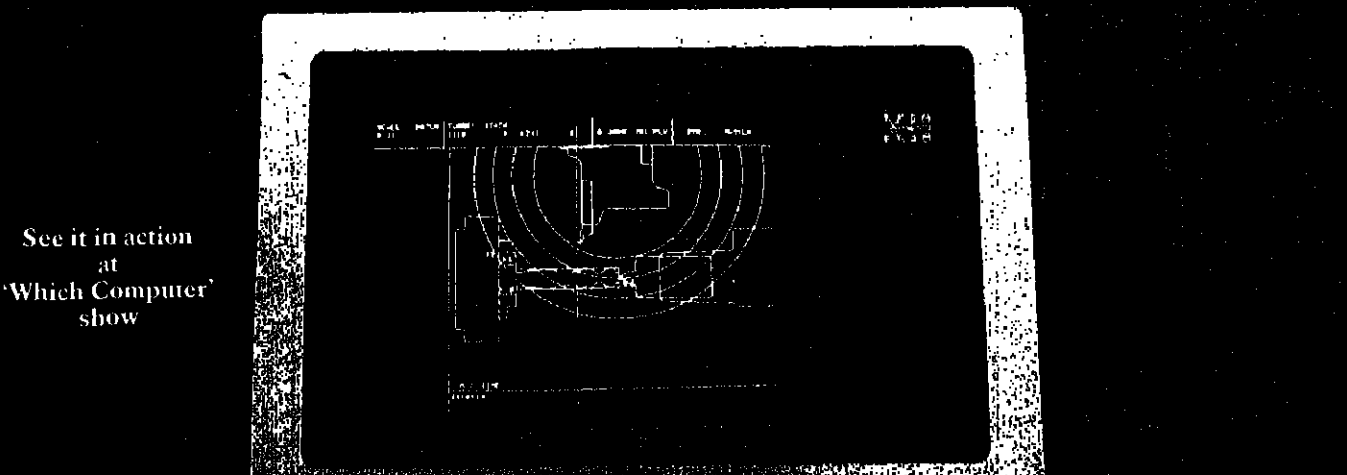
Compshop said: "We've stopped selling it after we had a note from them."

She stated that Compshop had to go to another source — "I haven't a clue who the supplier was" — after they were unable to buy the Toolkit from ACT Microsoft.

Council dispute

THE dispute at Tyne and Wear Council, where Nalco is pushing for a new technology agreement, is to go before the North Eastern Provincial Council, a joint union/employer negotiating body. As reported last week, Nalco is refusing to let its members operate a Bitly word processor installed in the Tyne and Wear Architects' Department.

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PROGRAMMERS' PAGE

Brain-teasers — human v. computer approach

THERE'S this tall office building with tinted windows. Inside, on the ground floor by the lift, stand three anxious programmers and three representatives of management.

They are having talks about possible redundancies which have to be settled by the time all six reach the director's office on the eighth floor. The only way to get there is by the ancient lift which will carry two persons max. and needs a minimum of one to operate it.

Series

Company rules state that if management outnumber the programmers at any time, either on the ground or the eighth floor, the programmers will be made redundant, and whichever floor the lift is on, its passengers are counted as being on that floor. The task is to get all six people up to the eighth floor in the smallest number of lift journeys and with no redundancies.

Is your mind ticking over, already rocketing the programmers skywards and back to avoid their fate, or have you consigned them to redundancy with a shrug?

Problem solving is integral to the job of programmer or analyst, and is a great part of the attraction. There are almost as many ways of reaching the final solution as there are people, and this week 'Programmers' Page starts a series on types of problems, the approaches that different people use, and the route the computer takes to the same solution.

A first look is at the brain-teaser, and future weeks will continue with board games such as chess, universal problem-solvers of which the main two are heuristics and means-end analysis, and finally turn to artificial intelligence techniques for a kit of problem-solving tools in the form of a programming language — not Cobol or Basic.

Meanwhile, back at the lift-shaft, there is one mistaken as-

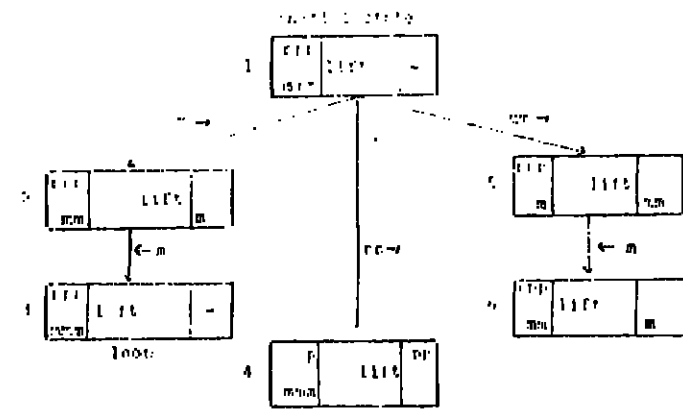


Figure 2. A search tree.

umption which will prevent you reaching a final solution. Have you spotted it?

One approach is the good old trial-and-error, and using it you may end up in one of several situations. In two lift journeys you could end up with two management reps and one programmer on the eighth floor and redundancy ringing down the corridors, or you may get into a loop where the only available move brings you back to the original state (see Figure 1). Talks reach deadlock!

Alternatively, in your shuttling back and forth you may have successfully lifted two managers and two programmers to the eighth floor, but are now stuck. Sending two back — one would result in an illegal situation — goes against the grain and intuitively feels like a retrograde step. It looks suspiciously like another loop.

Any of these situations involves back-tracking and undoing some previous moves in order to try new ones. In strategic terms this is a 'search tree' (see Figure 2).

The tree is grown, and shaped, by the particular strategy used to

seek the solution. Humans employ a variety of ways, including trial and error and intuitive guesswork. Computers preferentially would be directed to one of two strategies — the depth-first or the breadth-first search.

In the depth-first search, each pathway is explored to its bitter end. The search is essentially a plod through each path, completing one before turning to the next. A computer working systematically to stave off redundancy follows a hierarchy of moves. It will keep trying the first move until this fails and it is forced to adopt the next alternative. Once this has been made and a new problem state produced, the search returns to the first preferred move.

Programmed with a hierarchy of 1m, 2p, 2m, 1p, 1m, 1p, the computer sets off at node 1 by extracting one management rep but detects by a loop-check the dead end of node 3. It backs up the search to node 2 for an alternative, but none is possible.

Another backtrack to node 1 results in lift-off for two programmers but leads to redundancy

Figure 1.

notices on the ground floor, so back to square (node) 1 again for the third hierarchical move, 2m. This seems to work and allows the hierarchy to start again, eventually producing a loop at node 7, an illegal state at node 8, and signs of a breakthrough at node 10.

Shortest

In the complete search tree (see Figure 3) there are four possible solutions, and each can be reached in a minimum of 11 moves.

The strategy has certainly got us there, but is it the shortest solution, or is the lift burning up the shaft? Short of growing the whole tree and comparing paths, there is no guarantee that it is the best.

The breadth-first search accommodates this by looking at all states simultaneously. All the states reached by one move are grown, then all those by two moves, by three moves, etc. The first solution found is bound to be the shortest, though not necessarily of the same node pattern as the depth-first tree.

One more variation is the backwards search, working back along the pathways from the final solution. This guarantees that any path followed is not a dead-end or a loop. However, in practice the answer is not always known before-hand, and in theoretical terms not all pathways lead back to the original state.

A backwards tree for moving the band of six from the ground to the eighth floor would be exactly equivalent to the forwards tree for moving same from eighth to ground. So "backing down" gets the programmers nowhere.

Computers are excellent at solving this sort of problem. While a human is still herding the first two

people into the lift the computer has the whole lot neatly packed up in the director's office, without a whisper of the word redundancy.

The difference is in memory capacity. Having eliminated branches leading to loops or illegal states, the computer can follow each path exhaustively to its end. Humans, having limited memories, find it difficult to keep track of all moves down even one path, or to foresee where a move may lead them, so are advised to resort to intuition.

Strictly speaking, they do as follow either a depth-first or a breadth-first strategy but tend to concentrate on lengthening a single path, chosen by hunch, which they are often reluctant to let go.

At one point in the problem, 2m, 2p, and the lift are on the eighth floor, leaving 1p and 1m at the bottom. Gut feeling would tell you that having got four people upstairs it would be a pity, and probably counter-productive, to bring two down again, back to a previous state. An assumption made on past experience and the move discarded.

It is, in fact, a vital move. The important difference is that the lift ends not on the eighth floor but on the ground.

Brain-teasers and trick problems are characteristically similar to more common problems but contain a twist that makes the usual solving techniques inappropriate. So hunches that would normally work, are liable to lead us astray.

Some humans make the false assumption in the redundancy problem, and refuse to take the retrograde seeming step. Hence they fail to find a solution.

The computer has no such inhibitions.

by Pamela Rowe

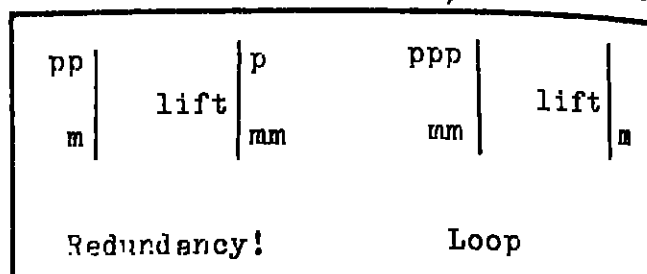


Figure 1.

notices on the ground floor, so back to square (node) 1 again for the third hierarchical move, 2m. This seems to work and allows the hierarchy to start again, eventually producing a loop at node 7, an illegal state at node 8, and signs of a breakthrough at node 10.

Shortest

In the complete search tree (see Figure 3) there are four possible solutions, and each can be reached in a minimum of 11 moves.

The strategy has certainly got us there, but is it the shortest solution, or is the lift burning up the shaft? Short of growing the whole tree and comparing paths, there is no guarantee that it is the best.

The breadth-first search accommodates this by looking at all states simultaneously. All the states reached by one move are grown, then all those by two moves, by three moves, etc. The first solution found is bound to be the shortest, though not necessarily of the same node pattern as the depth-first tree.

One more variation is the backwards search, working back along the pathways from the final solution. This guarantees that any path followed is not a dead-end or a loop. However, in practice the answer is not always known before-hand, and in theoretical terms not all pathways lead back to the original state.

A backwards tree for moving the band of six from the ground to the eighth floor would be exactly equivalent to the forwards tree for moving same from eighth to ground. So "backing down" gets the programmers nowhere.

Computers are excellent at solving this sort of problem. While a human is still herding the first two

people into the lift the computer has the whole lot neatly packed up in the director's office, without a whisper of the word redundancy.

The difference is in memory capacity. Having eliminated branches leading to loops or illegal states, the computer can follow each path exhaustively to its end. Humans, having limited memories, find it difficult to keep track of all moves down even one path, or to foresee where a move may lead them, so are advised to resort to intuition.

Strictly speaking, they do as follow either a depth-first or a breadth-first strategy but tend to concentrate on lengthening a single path, chosen by hunch, which they are often reluctant to let go.

At one point in the problem, 2m, 2p, and the lift are on the eighth floor, leaving 1p and 1m at the bottom. Gut feeling would tell you that having got four people upstairs it would be a pity, and probably counter-productive, to bring two down again, back to a previous state. An assumption made on past experience and the move discarded.

It is, in fact, a vital move. The important difference is that the lift ends not on the eighth floor but on the ground.

Brain-teasers and trick problems are characteristically similar to more common problems but contain a twist that makes the usual solving techniques inappropriate. So hunches that would normally work, are liable to lead us astray.

Some humans make the false assumption in the redundancy problem, and refuse to take the retrograde seeming step. Hence they fail to find a solution.

The computer has no such inhibitions.

SOFTWARE FILE

Protection for micro users

A NATIONAL association is being set up for software houses specialising in tailored programs for the small business end of the market.

As well as setting standards for the industry, its concern is to protect the users — predominantly first-time computer users — who invest £12,000 or under in a microcomputer to help run their business, only to run into trouble with software which does not do its job.

The aim of the Software Producers' Association, called SPA, is to provide a range of high quality software packages which will be guaranteed and supported by members throughout the UK. Part of the plan is that program packages endorsed by SPA will have a money-back guarantee and all programs will be tailored to the user's requirements and supported by a maintenance contract.

Ripped off

One of the founder members hoping to bring about this users' Utopia is Peter Wills of Mercator Management Consultants in Bristol, who explained the reasons behind SPA to Computer Weekly.

"We are in the business of writing for the micro market, and we are aware that there is a lot of rubbish about, packages which fall

apart as soon as they are looked at. First-time users in particular get ripped off by buying systems that fail as soon as they're used — and that doesn't do any good to the reputation of the trade as a whole.

"People like us have to go in and pick up the pieces once the damage is done. Customers should be able to buy business systems that run reliably for ever and a day, but if they are new to the computer game they can only trust what they are told and can easily get cheated without some sort of security."

Rules

Another aim of SPA is to link specialists in different areas of the UK so that customers can go to a local dealer for purchase and support. Specialised areas such as systems for garages, market research, auctioneers and farmers could then be marketed nationally through agreements with their authors.

The rules for membership are still being worked out, but Wills intends that the association should grow slowly, partly through the personal recommendation of users and hardware suppliers. Members will be judged on their standards of writing and support, and invited to contribute software if their methods come up to scratch.

Membership can be terminated

Wang-Pactel team offers total system

MANUFACTURER Wang and consultancy Pactel plan to enter one of the most rapidly expanding software markets hand-in-hand. Pactel's manufacturing and inventory control system, PACS, has been implemented for Wang machines as PACSVS.

PACSVS will incorporate the interactive features of Wang's VS kit into its design and includes on-line data entry, inquiry and real time update facilities. PACSVS is based on an integrated database approach with indexed file organisation and multiple key access, and consists of eight modules.

Pactel claims that the PACS system techniques have been developed and proved over the last

Sharp airlines guide cheaper

THIS international time sharing AFL service I. P. Sharp has removed the surcharge on the use of the Official Airlines Guide database, making the cost of an inquiry about 25% less. The database has been available on Sharp's worldwide packet switching service for two years, and lists all airlines and scheduled flights for three months ahead.

Billings WP

THE word processing package from Mitsch for the Billings microsystem has been enhanced with software for letter and forms processing. At the same time, hardware prices have been reduced so that a single station WP system costs £6,740, and at the top of the range, the triple station system costs £14,925.

TRS-80 service

USERS of Pet and Apple microcomputers are invited to make use of a service set up by the National TRS-80 User Group, which is running a computerised bulletin board system. Members are able to access a central message system outside working hours as well as the TRS-80 Group's central library of Basic programs.

20 years. The system has over 150 users in various industries, spanning a dozen countries.

The main Planning Database module of PACS costs £3,000, and the price of the other PACS modules ranges from £1,000 to £3,000, with a top price of £25,000 for the entire system.

The agreement between Pactel and Wang is an illustration of Wang's concern to get into the software market by teaming up with established software houses to market independently written products. Although users speak highly of Wang systems software, the company has not until recently sought to sell its own applications.

Wang's presence at the recent Software Info exhibition in Chicago indicated its desire to be recognised as a marketer of "complete solutions" rather than hardware alone.

In South Africa Wang has an agreement with software house Magus marketing its MVP accounting package which has proved successful over a year or so. Wang is now working on agreements with other software houses.

Appeware addition

THE micro applications firm ACT Microsoft has released a software tool called Desktop Plan for the Apple II. The product comes from the Apple II Appeware section and is said to handle a wide range of financial calculations such as budget planning, cash flow, job cost estimating, profit and loss projections and sales forecasting.

Desktop Plan is menu-driven and interactive, and ACT's managing director, David Low, claims that it can give the same level of performance as offered by a minicomputer.

ACT is hoping that the Desktop Plan will appeal to the same market of first-time users as the successful VisiCalc development tool. It costs £25 from Apple dealers or from ACT Microsoft in Birmingham.

by Claire Gooding

Ada's impact to be 'professional'

THE BCS conference on the impact of Ada last week saw a distinguished gathering of programmers, analysts and academics bunting up on that most significant milestone in software, the US defence language Ada.

John Barnes (left), author of the language RTL/2 and consultant to the DoI on Ada policy, gave a historical overview of the language's development through its various stages of Strawnman, Woodman, Timman, Ironman and Steelman. Of the four colour-coded but otherwise anonymous tenders, CII-HB's "green" plan was accepted and adopted as the preliminary pattern for development, which has now resulted in Ada.

He explained that the main targets of Ada were reliability and the avoidance of irrelevant detail. Barnes put forward the idea of two cultures in software: the professional, which emerged in the mid-50s with Fortran, and the recently arrived "amateur", as characterised by the user of Basic and a

provocative suggestion: APL programmers.

Barnes pointed out the differences between these two "cultures" in terms of language uses, investment and maintenance in software. He identified Ada as a "professional" language, since while it took more time and care to write it, it was aimed at long-term comprehension and durability.

Easy to read

Illustrating the point with two lines of APL and the same problem expressed in nine lines of Ada, he demonstrated that while Ada might take longer to write, it was easily read and understood.

The benefits of Ada, he concluded, would be seen in better and more effective compiler checks, encapsulation and separate compilation of particular modules, abstracted data which would allow private declarations, strong typing and exception handling facilities and a strong documentation ability.



John Barnes... "two cultures in software."

'Four-fold package growth by mid-80s'

A REPORT from the US International Data Corp predicts a four-fold growth in the package market between 1979 and the mid-80s.

The report, Independent Package Software Reference Book, identifies the reasons for growth in this market as the lack of quality software from manufacturers and the increasing costs of in-house development. Here it agrees with the large number of surveys done in

this area in the last year.

IDC is also launching an IBM Marketing Information Service for the growing number of IBM-watchers in the industry. It aims to track 10,000 IBM and plug-compatible users in the US, reporting current equipment and migration plans. The service is designed to give hard facts to those making marketing predictions and will cost up to \$6,000, depending on the level of information required.

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OP SPOT

Teleprocessing offers a career path to ops

PASS any office block and you can be sure that inside are grown men and women brooding, plotting and generally worrying themselves over their promotion prospects. For operators or ambitious ones at any rate, the promotion blues often have a special note of pathos because there is no obvious career path beyond the post of ops manager.

One way that ops can make themselves more important, in their own eyes and in everybody else's, is to get smart when they hear that a teleprocessing network might be established around their installation.

Status

To an operations department as a whole, teleprocessing is viewed both as a challenge and a threat. Within data preparation and control it represents a reduction in workload and a corresponding drop in staff. Within operations itself, it brings more kit, more status and demands a change of role. At one level this change of role is on a day-to-day level. For example, during the day shift teleprocessing will bring less batch

work (possibly none at all) and operations will concern itself with maintaining an online system. Whether it is an inquiry, a remote job entry or a real-time system, the user has more direct contact with the central machine and will therefore know what effect the ops department has on that machine.

A teleprocessing system means that operations can no longer hide behind a user liaison area or well-cushioned batch scheduling.

For the career minded empire builders among ops, the change in role has the effect of giving them a foothold on the management hierarchy. Perhaps the real challenge of teleprocessing to operations is that whoever services the network must know more about the hardware and the business it serves.

If something goes wrong it is no longer enough for the ops to peep into a run dependency manual and then shout for engineers and support programmers. With teleprocessing there are many horrors which an operations team must recognise and plan for.

The teleprocessing system breaks down... the warehouse is unable to pack orders... the production line, starved of parts, falters and scores of workers are left twiddling their thumbs... such events are all too likely and pose questions to the ops department which it should have the knowledge to answer.

Consultative

How do you create a productivity scheme for factory hands which allows for computer breakdown? This would be particularly difficult if their shop steward had already seen a reduction in the clerical staff he had previously been looking after. But it's the kind of management decision which, at the very least, demands that operations has a consultative role.

The nature of teleprocessing gives an ops manager a good deal of potential clout.

Many installations do not provide the necessary skills and authority for the ops manager to participate to any significant degree. It is difficult to pin down

precisely why this is so. Sometimes it is a well-staged plan by development to retain or even claw back control. In other instances it is a reluctance of general management to recognise the ops manager as anything more than a jump-up machine minder.

Such an attitude is common and perfectly illustrated by the sites where the ops manager is not dignified with the title of "manager" but has to be content with "supervisor" or "controller." It's the class system rearing its wrinkled old head.

Challenges

More easily remedied is the reluctance of ops management itself to accept responsibility for teleprocessing users. Are they to see themselves merely as managers of their own little cabbage patches and feel all nervous and humble when they poke their heads out of the computer room? Or as managers in the context of the company where they work?

This is a subject near to the heart of Phil Cartmell, from Infotech Operations, the Maidenhead-based training organisation.

He believes that teleprocessing belongs to the operations department and sees it as giving ops managers technical and psychological challenges which many of them are not prepared to meet.

"I can count the real managers in ops that I know on one hand," he says. In his book the real managers are the people with ambi-

tions which extend far beyond the computer room. "These guys don't seem to realise that there is anything bigger for them."

He continues: "In many installations I see compromises. There are half-hearted attempts at structure and job responsibilities with perhaps an addition to the operating team's duties to provide first level teleprocessing support.

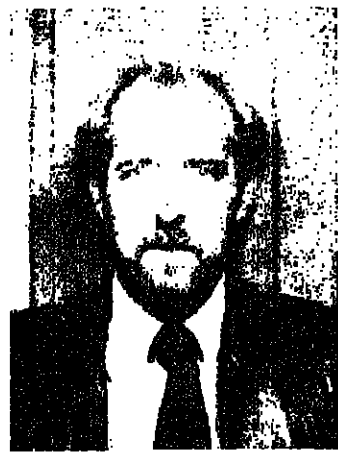
Any technical problems, however, are immediately rerouted either to a technical support area or the design office. It is not recognised by many operating personnel that a so-called technical problem is the withdrawal of a service and is a direct challenge to the business objectives of the system under threat. This is the same whether it's one terminal or a complete network at fault."

Cartmell argues that for the continued survival of the operating team at a higher level than button-pushers, they need to ensure that they control the network and have the necessary business related knowledge, technical knowledge and authority to cope.

As a first step he believes that ops should involve themselves in teleprocessing from the design stage through to implementation. He lists eight activities in which they should have some say: network planning; terminal and line configuration and selection; system aims; user education and expectations; user terminal training; processing throughput; service levels and monitoring facilities.

Teleprocessing is certainly something where ops can get involved as managers as well as workers, and promises a jump in status for those who take the chance.

by Paul Fisher



CARTMELL: "Operators don't seem to realise there is anything bigger for them."

Cartmell is swift to ask whether it is fair to expect that ops should show such initiative and accept responsibilities as well as operating a main frame. His answer is, naturally enough, that ops must be trained to the job - and such a training is provided by Infotech.

Qualities

Infotech is anxious to promote the position of network controller, who is not envisaged as a keen lad with a screw-driver but as someone able to decide priorities and who can deal with both people and machines.

If ops are restricted to doing monkey work they are going to be treated like monkeys and can't expect much better. If they become the kind of all-rounders that Cartmell suggests they should be, there would be no ground for the recurrent gripe that they are everybody's nobody.

Teleprocessing is certainly something where ops can get involved as managers as well as workers, and promises a jump in status for those who take the chance.

Keeping the customer satisfied

THE purpose of an excuse is to give a reason why something has gone wrong. For many clerks paid to catch flak on behalf of a large corporation it often doesn't matter if the reason is true or false. What is important is whether the reason is plausible enough to send a screaming punter on his way.

One of the surest and most intractable excuses known to modern man is to blame 'The Computer'. The ACM (the American equivalent of the BCS) formed a sub-committee to investigate what lay behind a batch of such excuses. It should have come as no surprise that in one case it was discovered there was no computer involved at all.

Phantoms

However, sometimes the computer - or those who told it what to do - is involved. Recently an insurance business appeared to be generating millions of pounds of loss. It was eventually traced to a set of phantom record files.

The same company had an inexplicable trickle of income. This was traced to an old lady. There was no test logic in the system to account for the fact that she had 'carried on paying her husband's life insurance premium years after his death.

The moral of this is that while some excuses are more plausible than others, the computer excuse is the most plausible of all.

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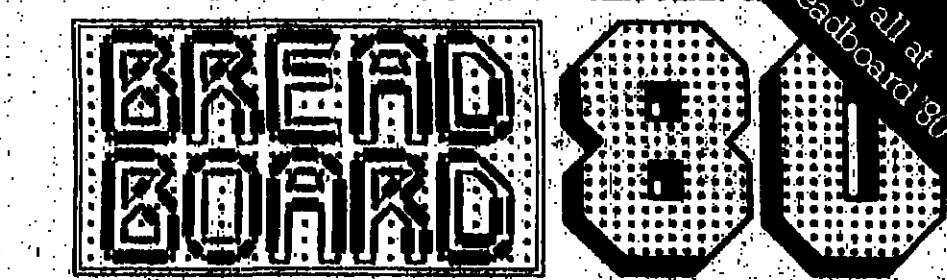
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Royal Horticultural Halls Elverson Street
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November 26-30 1980

This is the exhibition for the electronics enthusiast. From November 26-30 there is only one place in the universe for the electronics enthusiast to be - Breadboard 80 at the Royal Horticultural Hall in London. The majority of leading companies will be exhibiting, including all the top monthly magazines in the field. There will be demonstrations on most stands and many feature special offers that are EXCLUSIVE to Breadboard 80!

All aspects of this fascinating field are catered for, from CB to home computing, so whether you want to buy a soldering iron or a synthesiser, or just keep up to date with your hobby - don't miss Breadboard 80.

The man who wanted to fly

A CONTRACT operator, who has now left the game for a permanent post, was interviewed and accepted for a job in Scandinavia. The departure date was set and travel arrangements discussed. "Weather or not?" inquired the ops manager. "I'll be there," replied the agency. "The ops declined to go unless..."

The agency told him that they couldn't afford an air ticket and threats of litigation followed the operator's refusal to change his mind. Some while afterwards the ops manager phoned the man he would have been working for and, naturally enough, he was asked why he had not made the trip.

He told of his penchant for air travel. "That is very strange," said his would-be boss. "Most of our work is for an airline, so we were able to send the agency a free ticket for you. Very strange."

New directions for NATO

A CONFERENCE covering new directions and forecasts for NATO will take place at the Royal Aeronautical Society Lecture Theatre, Hamilton Place, London on December 1 and 2. Sponsored by the Technical Marketing Society of America and the Technology Transfer Society, the conference features experts from the US Army, Air Force, Marines, Defense Advanced Research Projects Agency and US Bureau of Industry, who will look at the entire weapons spectrum and combat vehicles.

It is called Battlefield Weapons Systems and Technology and the fee is £235. Further information from the Society of the Arts, telephone 01-242 4045.

CONFERENCES

SOUTHCON 81 makes its debut in Atlanta's Georgia World Congress Centre from January 13-15. It is aimed at design and specifying engineers in electronics, as well as those involved in design and specifying engineers in electronics, as well as those involved in design and specifying engineers in electronics, as well as those involved in design and specifying engineers in electronics.

ROGER VALLO, president of GTE Communications Network Systems, and Frank Yung, chairman of the telecommunications authority of Singapore, will address the opening plenary session of the third Pacific Telecommunications Conference to be held from January 12-14 at the Hilton Hotel, Honolulu, Hawaii. The conference, organised by the Pacific Telecommunications Council, will feature a panel discussion on telecommunications in the Pacific region and business experience in telecommunications. For further information, contact Richard Barber, conference director, on Honolulu 808-941 7789, or write to PO Box 23148, Honolulu, Hawaii, HI 96822.

MICRO NEWS

Education 20% of market by 1985

SALES of microcomputers in the US education market will approach a retail value of \$350 million a year by 1985, and account for 20% of the total microcomputer market, according to a report compiled by Creative Strategies in the US. The overall compound annual growth rate is expected to be greater than 30% for unit shipments.

The report, Microcomputers in Education, analyses the market for US systems costing under \$15,000 which meet certain design requirements. It states that 13 companies produce over 98% of the market, and seven others have possible potential for competing. At least 50 companies meet these requirements.

Shift

According to Creative Strategies the emphasis has shifted in the educational market from hardware features to software applications packages, better distribution methods, leasing, service and warranty programmes.

The report predicts that software sales should rise by an average of 28% over the next five years and that this growth will be faster for the first three years and slower in

the last two. The introduction of classroom software packages will stimulate sales of additional systems and more software. Peripherals are expected to grow at a rate of 40%, due to greater use of floppy discs and printers in networked multi-user installations. Packaged systems should exhibit a compound average annual growth rate of 26%.

In the US, however, the report predicts that the present potential market will be saturated by 1987, given the current growth rate. It is likely that the number of potential users will increase over the next five years due to the increasing penetration of educational institutions and the expanding use for microcomputers in education.

Of these 13 companies, market shares in education are similar to those in the overall market. Tandy leads in terms of unit shipments; Apple leads on sales figures; while Commodore takes a large portion of the balance. These three account for 85% of the total shipments to US educational establishments.

Others mentioned in the report that are participating in the education market include Atari, Texas Instruments, Cromemco, Hewlett-Packard, Intertec, North Star,

Ohio Scientific and Vector Graphics. Those not yet involved in this market include CompuLink, an associate of ACT, Onyx, Pertec, Sord and Zilog.

The report defines the various ways in which microcomputers can be used in education - firstly, the business aspect. Microcomputers for administrative purposes represent 5% of total microcomputer use in education.

In educational research, microcomputers represent 1% of total use, but this is increasing with the development of improved graphics and specialised software.

In the classroom, microcomputers can be used in three ways: computer assisted instruction, computer programming instruction and instruction in computer fundamentals. Classroom work represents 90 to 95% of all educational use.



A BUREAU service for use with the ACT Series 800 microcomputer (pictured above) is to be launched at the Which Computer Show to be held at the NEC in Birmingham next week. ACT is also launching a new range of business systems based on the 800 system and called the 850. At the top of the range the 854 and the 855 are based on 8-inch disc drives giving 2.4M-bytes of storage. The basic model in the range, the 852, comprises an 800 which runs the 8502 microprocessor from MOS Technology; a VDU, keyboard and two five-inch floppy disc drives with a storage capacity of 800K-bytes. It is manufactured by CompuLink in the US.

Texas bid to boost 'talking' sales

SALES of Texas Instruments' 99/4 talking home computer in the US have been disturbing enough to warrant the company running a rebate programme. But, according to TI retailers in the US, the programme, which was meant to help boost sales, has not generated the desired consumer interest.

Initiated three months ago, the programme has just been completed, and dealers are awaiting the company's next step. Meanwhile, at least two dealers have already discontinued the product, and others are considering doing the same, because, they say, it is overpriced and lacks software.

According to TI, sales in the UK have "not been high", but the company puts this down to the fact that the PAL system is not yet available. For users to operate the

99/4 in the UK at the moment, special monitors must be incorporated into the system, which respond to both the US colour standard, NISC and PAL. This puts the price up to about £1,000.

Too high

US dealers are complaining that the price in the US is too high; it is listed at \$950 for the console and \$450 for the monitor. The rebate programme offered a \$100 reduction on the price of the hardware, with \$100 worth of software free. But the only software available at the moment is educationally oriented.

The 99/4 system with PAL will become available in the UK next year. No programmes for boosting sales in the UK have yet been planned by TI.

Speech chip from GIM

A SPEECH synthesis chip which can run two methods of voice production including linear predictive coding - the one used by 'Texas Instruments' - was launched by General Instrument Microelectronics at Electronics 80 in Munich last week.

The SPO 256 operates mainly in the phoneme mode, but can use the LPC method for good quality speech. In phoneme coding, words are sliced into the 64 building block sounds, or phonemes, of the English language, and put into memory. On recall of a word, the phonemes are selected with the help of computer aids and constructed into the given word.

Available for £10, the SPO 256 has 16K-bits of ROM built in to the 28-pin NMOS device, which can reproduce up to 256 discrete sentences (words or phrases).

Filling a gap

BLETCHLEY-BASED Remek Micro Electronics has introduced a stand-alone expandable single board computer for use as an industrial control system. For under £500, the 16MC20, which is based on Texas Instruments' 16-bit 9981 microprocessor, fills a gap between programmable logic controllers and minicomputers.

500 accessories

ABOUT 500 different accessories for minicomputers and micros are now available from the UK centre set up at Runcorn, Cheshire, by the US firm Inmac which claims to be the largest independent distributor of its kind in the world. A catalogue can be obtained by phoning Runcorn (092 85) 67551.

Prices down

PRICES of Intel's 8748 single chip 8-bit microcomputer have been reduced by up to 30%. In 100-piece quantities the D8748, costs £33 and the lower temperature D8748-6 costs \$41.50. The 3.6MHz device now costs \$31.50.

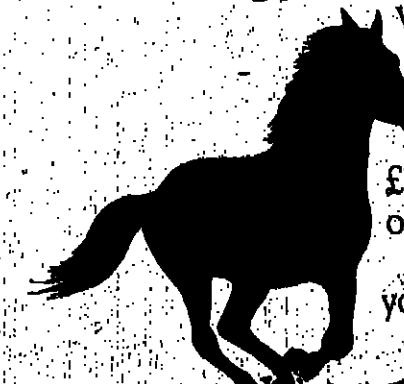
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LLOYDS BANK

Logica in talks to sell teletext system in US

FURTHER inroads by the UK into the US information supply industry look set to be made by Logica, which is negotiating with a US company to sell a teletext system for use in North America.

The US firm involved is not yet known, but it is probably one of the broadcasting organisations. The lack of central direction in US telecommunications has left the US behind several European countries in implementation of such services as teletext, which broadcasts textual information "on the back of" television programmes. Logica's system will be in competition with several other incompatible services. If one of these wins out and eventually becomes the standard, the market could be very large.

Logica's chairman, Philip Hughes, announced this development while reporting the company's annual financial results, which show turnover up 40% over 1979 to £18.7 million. Staff has increased by 20% to 940, including about 75 new graduates. The pre-tax profit of £677,992 was described by Hughes as "disappointing by past standards," owing to losses on several fixed-price contracts in the Netherlands. New offices have been opened in a Victorian mansion in Cobham Park, Surrey, renovated at a cost of £500,000. This was an attraction for potential senior staff who did not want to work in Central London.

A technology management centre has been set up within the company, taking over from the management sciences operation which had been getting considerably less business of late.

Brian Martin, heading the new centre, sees it as helping client companies to adapt to the changes brought about by computer systems installed either by Logica or other suppliers. This involves training staff and management and such things as restructuring staff gradings.

Paintbox

Logica is getting more involved in bringing one-off developments to a wider marketplace, Hughes said. An example is the Paintbox system, developed by the BBC, which allows artists to produce very high resolution graphics for broadcasting using a drawing tablet and a micro.

Artists can draw quite detailed diagrams and pictures, using a variety of different brush shapes, sizes and colours. A simulated "air gun" allows the filling-in of areas with colour, and very simple animation with flashing is being developed. The finished picture is stored in digital form on a floppy disc.

The development of Paintbox was entirely internal to the BBC, but Logica has a licence to manufacture and market it.



Logica has opened new offices in a Victorian mansion in Cobham Park, Surrey, renovated at a cost of £500,000.

Viewdata system for online travel bookings

FOLLOWING the announcement of plans by Thomson Holidays to develop a private viewdata system on Redifon kit for online bookings (CW, November 6) systems house System Aid has said that it will use the Prestel compatible viewdata facilities on the ICL ME29 to develop a similar application.

It will enable travel agents to make reservations using Prestel sets. System Aid also plans to use the ME29 to develop software for linking into the British Telecom Public Packet Switched Network. It will enable travel companies to

dispense with expensive dedicated lines and boost local processing capability.

System Aid derives most of its business from services for travel companies. It licenses its software to firms with their own in-house ICL machines like Yugotours and Cosmos, the latter having just ordered three ME29s worth £600,000. In addition System Aid's own machines, which consist of a six-year-old 2904 as well as a new ME29, are used by travel firms with an in-house computer, like Global and the UK end of Compagnia Italiana di Turismo. The planned private viewdata

system will present travel agents with screen formats that conform with the standard drawn up by the Holiday Systems Group.

This is the committee set up by the major tour companies to ensure that agents are not confused by many different types of viewdata picture.

Connection to PSS will enable tour operators' reservation systems to be added to Travicom 2. This is the PSS-based network planned to replace the existing Travicom system which uses dedicated lines to link travel agents to the reservation systems operated by about 20 airlines.

'Involve operators in VDU design' plea

VDU manufacturers were slated in London last week for the scant attention they pay to ergonomic considerations in the design of their products. Speakers at Datasab's ergonomics conference urged manufacturers to involve operators, psychologists and ergonomists in design, rather than relying solely on engineers who concentrate on providing efficient and reliable systems.

Too late

An occupational psychologist with British Telecom, Bernard Stewart, said that some systems had screens which often provided "a jumble of incoherent information," causing stress and problems for the operator.

He said, "Text formatting is often left to the engineers. It's no use

calling in the occupational psychologist after the design of the VDU has already been fixed. It's too late then."

Co-author of Vision and VDUs, Sam Rosenthal, pointed to three main problems relating to VDUs: the visual unsuitability of the user, the quality of the equipment and the layout of the office, but stressed that none was insoluble. "We must consider the needs of the user as well as the marvellous equipment. We need less reflective screens and fewer characters on the screens," he added.

The first of three seminars on VDUs and their effects is to be held by the Human Science and Further Advanced Technology Research Group, HUSAT, on December 11. Information from the Secretary, HUSAT, The Blims, Elm Grove, Loughborough University, Leicestershire LE11 1RG. Tel. 0539 63171, ext. 393.

IAL Gemini launches IBM-based retail system

AN IBM-based retail system has been launched in the UK by IAL Gemini Computer Systems.

Called Storemaster 1, and based on software from Fisher Business Systems of Atlanta, Georgia, the system is aimed at the smaller retailer with an annual turnover of up to £3 million. It is a small business computer with point-of-sale facilities provided by the IBM 5260 computerised cash register, a device which supports OCR and bar code readers. The basic software costs about £5,000 and hardware starts at £8,300. Capable of handling 35,000

inventory items and 10,000 customer accounts, the system is based on six interactive programs: stock control, sales analysis, accounts payable, general ledger, accounts receivable and payroll.

Written in basic, Storemaster is menu driven, which means that the user is presented with a list of program options and selects the one he wants by entering the appropriate number on the keyboard. IAL Gemini claims that the system is easy to install, learn, operate and easy that it is intended for non-computer specialists.

First commercial Cambridge Ring up in 12 hours

THE first commercial implementation of the Cambridge Ring system, delivered to Imperial Chemical Industries, was installed and running within 12 hours. And this included the time taken to find and fix a fault in one of the processors to be attached. The system, delivered to ICI's plant in Runcorn, Cheshire, is also a "first" for the Cambridge-based company Chris Computer. Their first product, it uses medium and small-scale integrated circuits as specified by Cambridge University Computer Laboratory, where the Ring was developed, and a board layout produced by University College London.

Orbital production engineered the product and built the power supply, packaging and interfaces for the first two systems to be connected to the Ring at Runcorn - a Computer Automation LSI-4 and a Digital Equipment PDP-11. The software to drive the interfaces was commissioned from Topex, another small company nearby, which like Orbital sprang up out of the academic community in Cambridge.

Imperial's Ring is a trial system with just four nodes costing £1,200 each and a monitor station costing £1,500, plus the interfaces at £500 each. Costs are expected to fall to about £500 per node - consisting of a station and a repeater in each - when Ferranti gets the LSI implementation into production next year. First samples have been tested in Cambridge and are working over 80% of their area. Second stage samples are expected early next year. Customers for the finished item are expected to include Racal and Logica.

Collision

Econet uses a four-wire cable with centrally generated clock signals on two of them running in anti-phase to each other and data on the other two, also in anti-phase, being transmitted at 200k-bps for up to 500 metres. Collision detection is by sensing in-terminated voltage levels brought about when some of the colliding bits cancel each other out.

Econet interfaces are expected to cost between £50 and £60, giving a station price of about £300 complete with Atom and television. This would have two kilobytes of RAM and 8K Base in ROM and would be useful for teaching Basic in a classroom. This application is aided by its "screen" routine which enables a supervisory station to copy the screen image of any of the students' stations on to its own screen.

COMPANY NEWS

NCR succeeds with \$60m offer for ADDS

AFTER having to extend the closing date of its offer several times, and being threatened with litigation, NCR has finally succeeded in its bid to take over terminal manufacturer Applied Digital Data Systems of Hauppauge, New York.

By the time its offer finally expired on November 6 NCR had picked up 92% of both the common and preferred shares of ADDS at \$12 and \$27, respectively.

Its offer valued ADDS at about \$60 million.

As expected ADDS will continue to operate with its own management, enjoying a high degree of autonomy despite being wholly owned by NCR. The subsidiary set up by NCR to buy ADDS shares has now been merged into ADDS.

A spokesman for ADDS UK, wholly owned subsidiary of the US

firm, said that they had been assured by NCR here that they would remain autonomous. The main products sold by ADDS UK are the System 75 small business machine which costs about £4,000 and Multivision, a commercial configuration announced earlier this month that costs £3,000 in its single screen version.

The OEM terminal products of ADDS, which are still the biggest side of its business, are sold here by Terminal Display Systems of Blackburn.

NCR has been by far the biggest ADDS OEM customer and its move to in-house VDU manufacturing could have hit ADDS hard financially without the takeover. ADDS turnover for its current financial year ended November 30 is unlikely to be more than \$10 million up on last year's figure of about \$51 million. At the same

time ADDS points out that a lot of its energies of late have been channelled into expanding manufacturing.

Some ADDS shareholders tried to stop the NCR takeover with legal action, although the level of opposition to the NCR bid was limited compared with the objections raised to a bid made in the summer by the Mitel Corp of Canada (CW, July 31). Mitel offered \$11 and \$25 for the common and preferred shares.

Storage ahead

STORAGE Technology results for the third quarter, ended September 26, show that it is sustaining profitable growth. Turnover increased by about 24% to more than \$150 million while net profits moved up from \$11,332,000 to \$12,122,000.

One contract turns the tide for Cray

JUST one contract, the sale of a Cray-1 supercomputer to the Mitsubishi Institute in Tokyo, has provided Cray Research with results for the third quarter, ended September 30, of its current financial year that show a dramatic improvement over the same period in 1979.

Turnover jumped from \$4,392,000 to \$12,634,000 while a

net loss of \$288,000 in the third quarter of 1979 was turned into a net profit of \$1,646,000.

The nature of Cray's business has inevitably resulted in big changes from quarter to quarter. But the results for the first nine months of 1980 indicate a long-term upwards trend. Turnover came to \$44,080,000, compared with \$28,424,000 last year.

Harris doubles its shares

PAVING the way for possible future acquisitions or financing programmes, Harris Corp in the US has doubled its number of authorised shares from 50 million to 100 million. There are currently some 30,446,000 Harris shares outstanding, the rest being unissued.

Harris chairman Dr Joseph Boyd said there were no current plans for the additional shares but pointed out that they would give the company "flexibility to take prompt advantage of the opportu-

nities that may occur."

Sales up 300%

INGERSOLL Electronics reports that company sales for this year are up more than 300% on last year. The increase is attributed mainly to the success of the Atari home video computer system which is distributed in the UK by Ingersoll.

City firm takes over Bunzl bureau-for free

ROLFE AND NOLAN, the City firm taking over the bureau, side of Bunzl Data Systems (CW, November 12) is paying BDS parent Bunzl Pulp and Paper nothing for the ailing bureau's customer line-up.

But under the terms of the agreement between the two companies Rolfe and Nolan will rent the Digital Equipment PDP-11/70 that hosts the BDS services and take out a five-year lease on the

computer suite located at Bunzl's headquarters at Friendly House in the City. It is also paying Bunzl £16,300 for some fixed assets.

Rolfe and Nolan is also taking on eight of the ten staff that ran the BDS bureau. It generates an estimated £180,000 worth of business at the moment from 23 clients. Rolfe and Nolan's existing services, aimed mainly at commodity brokers, are run on two PDP-11/70s originally supplied by BDS. There have been close trading links between the two companies for about four years.

Allen Computers International, one of the other parties interested in taking over the BDS bureau, said that it decided to call off its talks with Bunzl at a board meeting on November 5 because "an analysis of income and expenditure figures proved particularly disappointing."

One BDS service not being taken over by Rolfe and Nolan is the Fimar financial modelling package, the rights to which are being bought from Bunzl by BDS managing director, John O'Connell. He is leaving Bunzl at the end of the year to set up his own Fimar service.

The BDS financial ledger, stock control and specialised banking systems will complement the existing services of Rolfe and Nolan which are currently bringing in about £750,000 worth of business a year from more than 50 clients.

CIG group buys Metra stake in Lowndes-Ajax

THE Brussels-based CIG Group, which bought the Lowndes-Ajax bureau from Hill Samuel this year, has now reached an agreement with the Metra Consulting Group of France to buy out its minority share in Metra Lowndes-Ajax. The deal should be completed by Christmas.

Based at Croydon, Metra Lowndes-Ajax provides facilities management, turnkey systems, software and consulting services.

Last year it took over Tempo Timesharing, the Digital Equipment specialist systems house, and renamed it MLA Business Systems.

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CW SHARES TABLE

Date: 11/11/80				Index: 101.91 Change: -2.42				
100		London Stock Exchange		Price		U.S. Stocks		
High	Low	Block	Price	Change	High	Low	Block	
91 1/2	90	A. Goma Tech (100)	42	-4	21 1/2	11 1/4	Commonwealth	22 1/2
91 1/2	90	AGC Int. (100)	42	-4	21 1/2	11 1/4	Consolidated	22 1/2
91 1/2	90	B. B. Corp. (100)	42	-4	21 1/2	11 1/4	Consolidated	22 1/2
91 1/2	90	Chang Corp. (100)	42	-4	21 1/2	11 1/4	Consolidated	22 1/2
91 1/2	90	Chang Corp. (100)	42	-4	21 1/2	11 1/4	Consolidated	22 1/2
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91 1/2	90	Chang Corp. (100)	42	-4				

PEOPLE and EVENTS

Project leader wins IETE women's award

PROJECT leader Fenella Hume has been named Girl Technician Engineer of the Year. She receives an inscribed rose bowl and £250.

Fenella Hume, who is 23, began her career as a trainee test engineer in 1974 with Cambridge Scientific Instrument. During her four years with the company she was promoted to service workshop engineer and then junior design engineer. In 1978 she joined Kent Industrial Measurements as development engineer, and in September last year was promoted to project leader.

She has an HNC in electrical and electronic engineering and is in the third year of her BSc in electronics. Runner-up was 25-year-old Sally

Mourice Scott has been appointed financial director of Sigma Electronics. He was formerly financial controller at Rasat-Zonal and KDG Instruments.

Roger Moorey has joined ATS Telemetry in Haywards Heath as chief engineer. His previous experience has included positions with Monolog Systems and Computing Techniques.

David Low is the new managing director of ACT Microsoft. He was formerly European manager of the company's microcomputer division.

Kevin Penche has been appointed manager of the new Technical Support Division of Computermail. Colin Winsor has been named UK sales manager at the company's Sales and Marketing Division.

William Tollinger has been appointed director of systems engineering at Hestech in New Hampshire, US. He previously worked for Hendrix Electronics, where he supervised the engineering and development of the word processing product area.

Boswell, assistant instrument engineer at Glaxo Production and Engineering Services. She is currently working on a microcomputer system to control air conditioning and plant for new research buildings in Hertfordshire. She received £100 and a pen. The other four finalists were Barbara Daymond-John of British Telecom Research; Jennifer Waugh of GEC Telecommunications; Jayne Wood of Marconi Avionics and Joanne Hasey of Marconi Space and Defence Systems. They each receive a pen.

The award is sponsored by the IETE and the Caroline Hestert Memorial Trust. The number of entrants this year was between 20 and 30, according to John Clannell of IETE.

Duncan Johnston, former real estate manager of Burroughs Machines, has taken on a similar post with the company's Europe/Africa Division. Before joining Burroughs, he worked in local and national government and with several large companies including the Grand Metropolitan Hotels group. His successor is Chris Gilbert, formerly Burroughs' assistant real estate manager.

Trevor Cotton has joined ICL's Southern Sector Marketing Department as software and services manager. He was previously with DataLink, working as product planning and acquisition consultant.

Peter Heptonstall has joined Hallmark Computers as business systems sales manager. He joins from Telecomputing.

Geoff Lewis, who established the Edinburgh division of Mills Associates, has been appointed software administration manager of Mills Associates in Monmouth. Replacing Lewis at Edinburgh is Jack White, who has been promoted from operations manager.



Chairman of GR International

JACK McNally MBE has been appointed chairman of GR International Electronics, Perth. His career includes 22 years with Beckman Instruments, 13 of which were taken up as managing director, and the last four as chairman of the three Beckman companies. He is also chairman of Beckman's operations in France and Italy.

He is currently chairman of Tried Technical and Industrial Services, and deputy chairman of the Scientific Documentation Centre.

McNally is a member of the CBI (London) Regional Development and European Committees, and was recently elected a Fellow of the Royal Society of Arts.

Top job at Prime UK

AS PART of Prime Computer's UK expansion, Neil McMillan has been appointed managing director. He joined Prime with over 18 years' experience in the computer industry.

Between 1965 and 1974 he held various posts with Honeywell Information Systems, starting as a systems representative in Chicago and eventually becoming manager of large systems marketing in the UK. He left Honeywell to work as regional manager

for central government sales at ICL in August 1974, staying three years with the company.

His most recent appointments have been with Computer Automation, where for over two years he was responsible for sales and support operations throughout Europe, and with Sperry Univac (Australia) where he was responsible for sales and support operations throughout New South Wales.

Ken Taskard has joined Data Logic's Communications Products Division as sales executive. He previously worked for Nolton Communications, also as sales manager.

Ian Locke has been appointed principal liaison engineer with Ferranti Computer Systems in Sydney, Australia. He previously held several posts within the Australian Department of Defence at Canberra.

Brian Walker has joined United Leasing Ltd as UK sales manager. He was formerly with the Inland Revenue.

Keith Newman has joined the technical support department of Computer Machinery Company's North West Home Counties branch. He was previously with Leibherr Great Britain.

Harold Scott has been named national marketing representative for TRS-80 Video sales at Radio Shack, a division of Tandy Corp.

COURSES

Micros for management

A WORKSHOP on the use of microcomputers for management information is being held at The Chiswick, Putnam Square, London W1H 0A from November 26-28. Organized by RB Conferences, the workshop has been designed to give participants practical experience with different mini-microcomputers, programmed to handle management information based on probabilities. Those expected to find the course useful are chief executives, and directors/managers concerned with marketing, production, purchasing, R and D and personnel. The fee is £285 + VAT, and includes two nights' accommodation. For further information telephone the organizers on 01-946 6062.

Coping with new technology

A SEMINAR for senior executives, aiming to demonstrate how to manage the change brought about by new technologies will be held in Spain from December 4-7. It is organized by CMS, and will examine the role of the senior executive as well as highlighting management techniques to show how future business problems and plans can be handled. Details of the seminar, to be held at the Hotel de Goya, S'Agust, Costa Brava, from CMS, Lugard House, 110 Fleet Street, London EC4A, Tel: 01-583 6691.

DIARY

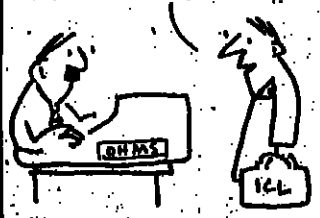
NOVEMBER 25 Meeting: IBM Minicomputers, BCS Microprocessor Group, BCS headquarters, 2.00.
Meeting: Word Processing and Office Automation, in the US, BCS Word Processing and Office Automation Group, Prudential Assurance, Holborn, London, EC1, 5.30.
Meeting: Networks and Fund Transfer, BCS Data Communications Group, BCS headquarters, 6.00.
NOVEMBER 26 Meeting: Microcomputers in Health Care, BCS Medical Group, Middlesex Hospital, London, Apply to Hospital Physicians Association, 47, Belgrave Square, London, SW1.
Meeting: Management game, IDPM Sheffield branch, Cornsare Offices, Sheffield, 6.30.
NOVEMBER 26-27 Meeting: State of the Art Review, Infotech, Connaught Rooms, London, 9.00am, Tel: (0628) 35031.
NOVEMBER 27 Meeting: Word processing, IDPM Central London branch, Meaton Room, National Liberal Club, Whitehall Place, London, SW1, 6.30.
Meeting: The Design of Distributed Microprocessor Systems, IEE Computing and Control Division, IEE, Savoy Place, London WC2R 0BL.
NOVEMBER 1 Meeting: Computer Arts Society,

Art Lambert has been appointed vice-president and general manager of Computer Cable products division of Vertex Electronics in Farmingdale, New York. He has 18 years' experience in this field.

Tony Rand has been appointed general manager and financial controller of Sinclair Research of Cambridge. He was previously assistant to the managing director of Trident Management. Sinclair's new production controller is Dave Chatters, formerly with the company's Radionics division at St Ives.

Liveware File

HOW MUCH TAX REFUND...



SORRY, I CAN'T HELP YOU...



Senior consultant

PERCY BARRACLOUGH has been appointed senior consultant at Systems Consultants Ltd (SCL). The company has made two other new appointments: Bob Hair joins as system and programming development manager, and David Robertson becomes sales systems analyst. All have had over 15 years' experience in the computer industry.



Office of the Year entries

ANYONE interested in entering the Office of the Year 1981 award should contact the Institute of Administrative Management, 205 High Street, Bexhill, Kent. Tel: 01-658 0171.



50-51 Russell Square, London WC1, 7.30.
Seminar: Computer Aided Production, BPICS, Garden House Hotel, Cambridge, Tel: (0279) 72354.
DECEMBER 9 Meeting: Weather Forecasting, BCS Groydon branch, Maple Room, Groydon Halls, Groydon, 7.15.
DECEMBER 10 Meeting: Role of mathematical programming, BCS, London School of Economics, London, 6.30.
Meeting: Computers in Manufacturing, BCS Information from Huntington Research Centre, Huntington, Cambridge, 6.30.
DECEMBER 1 Meeting: Computer Arts Society,

ICL AND IBM OFFER PRICE/PERFORMANCE BOOST WITH NEW MACHINES

2966 for PAYE processing

ICL deputy managing director Peter Ellis has confirmed that the company will be offering its new 2966 mainframe to the Inland Revenue as the machine for handling online PAYE processing.

After talking to ICL for more than two years the Inland Revenue has now formally issued the company with an operation requirement following the government's decision to invoke the single tender procurement policy before it expires at the end of the year.

Ellis said the contract would be worth between £30 and £40 million to ICL, but commented that it was more important to the company in terms of maintaining its credibility than the actual money involved.

The contract to supply the 20,000 terminals required for the PAYE system is not subject to the single tender policy and will be open to bids from any potential supplier. But the Inland Revenue said it was confident that one or more UK-based firms will be able to satisfy its requirements, the main one being compactness.

The total terminal business will be worth about £30 million and



ELLIS... The contract is more important to the company in terms of maintaining its credibility than the actual money involved.

one obvious contender, Ferranti, said that it would be offering units based on its P17 series terminals which already come in ICL-compatible versions. It would be willing to make any hardware or software modifications to meet the specification.

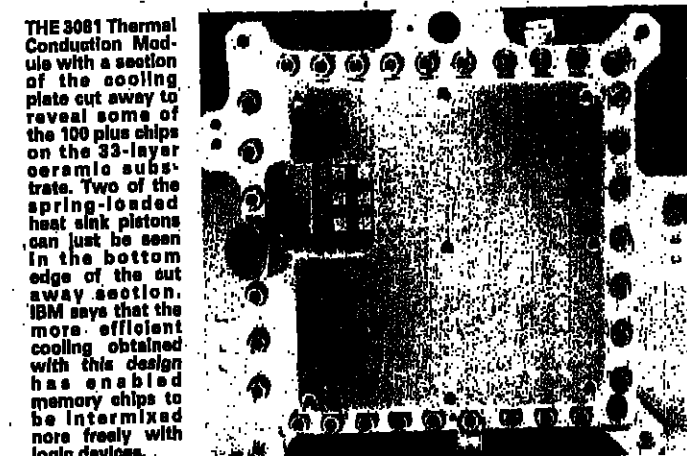
The Inland Revenue plans to install four or five single processor mainframes at each of the 12 proposed regional centres. Each will support about 500 terminals and ICL's capability to handle this volume has been carefully investigated by the Inland Revenue.

'No wires' key to H-series

● From front page

deal of costly wiring with lines deposited on the layers by molybdenum metallisation. IBM points out that the 16 layers providing the signal path contain a collective equivalent of more than 6000 wires.

To overcome cooling problems, IBM has sealed the substrate and chips into the elaborate Thermal Conduction Module, an assembly



consisting of an outside plate embedded with cooling water channels and spring loaded metal heat sinks pistons linking the plate with each chip.

The space between the plate and substrate is filled with helium to help cooling further and to protect the devices against chemical contamination.

Wiring is reduced further by the boards on which the Thermal Conduction Modules are mounted. Each board incorporates 20 power and signal layers. According to IBM only 6% of the connections in the 3081 processors unit are made by cables and wires.

A significant architectural feature of the 3081 is the use of a separate processor controller, the 3082. It handles unit initialisation and microcode loading and assists in hardware error recovery.

IBM has announced no new software with the 3081.

CME provides 'virtual' link for parallel operation of systems

A CLUTCH of new operating systems announcements accompanied ICL's launch of the 2955 and 2966 last week. As predicted by Computer Weekly earlier this year (CW April 17), the "time slicing" technique is being used to allow 2900s to run VME and DME simultaneously.

A microprogrammed software harness, Concurrent Machine Environment, now links the larger VME systems for virtual operation to the DME Direct Machine Environment so that DME and VME can be run in parallel.

DME itself was introduced three years ago to allow users of

the 1900 to "migrate" up to the larger 2900 and continue to run their old software on the new hardware.

This meant that the daily workload could be run as usual, with VMEB and VMEK development undertaken at off-peak periods.

Redistribution

Now CME, also developed through microprogramming, allows the user to run DME and VME workloads together. According to ICL, applications can be developed in the same shift, and the user can control machine resources allocated to each regime.

The microcode is said to be modular, so that it can be tailored at load-time to take account of individual needs. As the workload shifts towards VME, resources can be redistributed by partitioning store, allocating peripherals, power, and communicating devices between the two regimes.

The asterisks in fig. 1 indicate which version of CME will apply to various combinations of hardware and operating system. For example George 3 users (who usually show such devotion to the OS that it is hard to imagine VME getting a warm welcome in any circumstances) will be able to link

with VMEB or the new entry-level VMEB-E on a 2966 using CMEB3.

Programs run under VME can read and write data from 1900 DME files through the Adram facility; this entails what is promised to be "a minor change" to ICL when a VME program accessing 2900 data follows a DME record access.

The entire range of applications such as DDS and IDMS, TPMS, and screen editors, are available with CME but CME itself will not be available across the entire machine range. Users of 2946, 2950, 2955, 2956 and 2966 will have the option open to them, but 2960 users have been left out in the cold. ICL gives an example of pricing for the system at £530 per month for CME on a 2966.

Clare Gooding writes: Announcing CME allows ICL to keep

a foot in both camps. It has to tread a careful path between nudging its customers towards the Information Processing Architecture on which its future plans are laid, and losing them completely by demanding the upheaval and loss of investment involved in converting operating systems.

Bridge

In fact, CME is a bridge which allows users to perpetuate outdated batch systems which originated with DME; a concept which still supports many customers who have invested a great deal in it.

It's good that ICL is aware of its customers' present needs as well as future ones, but the danger of providing such a bridge is that some will dawdle on it rather than crossing the river once and for all.

The versatile 'K'

ANOTHER release of ICL's operating system VMEK, K8V18, follows quickly upon the heels of K8V17, which completed field trials a month ago.

The revamped K will support the newly announced 2966 and is said to incorporate new features while building on facilities available in the current version, confidently referred to by the catchall title VMEK8V17.50.

The K8V18 version provides support for the Information Processing Architecture features such as Remote Session Access, Distributed Message Router, Distributed Application Facility and File Transfer Facility, as well as connection to the X25 packet switching standard.

K8V18 also supports CME2 and Adram 1900 and the Modular Disc Storage System. ICL promises "exceptionally high throughput."

ICL has also introduced a new version of the large systems OS VMEB. Called VMEB-E, it is an entry level system aimed at new users to provide straightforward implementation, and a simplified growth path from medium to large 2900 systems, leading eventually to network configurations.

It is built on a modular structure so that features such as transaction processing, performance measurement and accounting can be built into the basic system while normal operation continues. It is available on single and dual 2900 systems; 2966, 2980, 2986, 2970, 2972, 2976, 2980 and 2982. ICL is obviously firmly committed to IPA, and VMEB-E is another lure to win customers for data access mechanisms supported by VME which provide the foundation for future developments.

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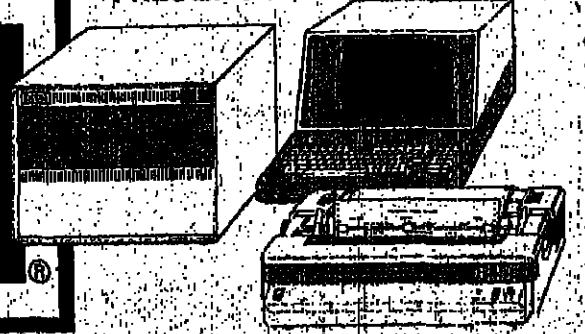
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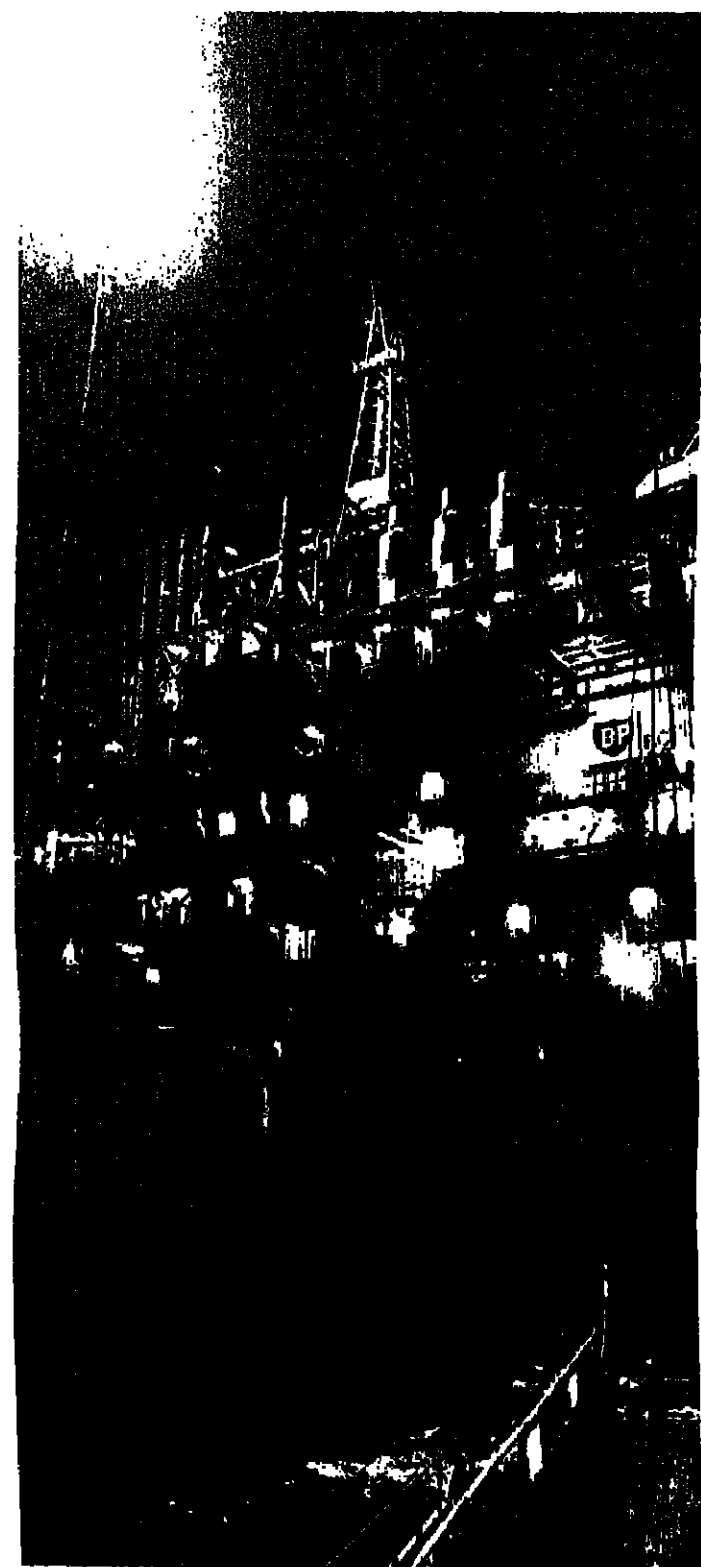
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How DP helped in the switch from buyer to seller



Night view of production platform FC, Highland One, in BP's Forties oilfield in the North Sea.

IN the past 18 months, BP has had to cope with the effects of the Iranian crisis which has deprived the company of 40% of its crude oil supplies; nationalisation of its oil interests in Nigeria with hardly a warning; and a 100% increase in the cost of crude oil supplies from Opec countries in a period which also saw Opec backslating its prices, further complicating the financial situation.

Coping with such situations is not just a case of juggling with numbers. Changes in the prices and availability of crude oil not only affect what is bought and sold. There is also a significant impact on the processing volumes of refineries, both those producing petrol and oil products, and those making chemicals and all of the other derivative products; bulk shipping movements of crude oil, petrol, etc. are affected; strategies are substantially altered and a multitude of financial decisions have to be made.

Yet despite all this, BP's gross revenue increased last year by £5,200 million and its net income by almost £1,200 million. Effective management decision-making obviously forms an important part of the ability to control finance in such conditions, but efficient computer systems also play an important part.

Vast

Computer systems used within BP for accounting functions are not all run-of-the-mill systems. The general ledger, associated accounting and management information systems for BP Trading alone are so vast and complex that they involve some 30 programmers and analysts in maintenance and constant development.

BP Trading's accounting systems also involve computer generated input from many other systems throughout the world.

BP Chemicals, for example, have seven principal factories in the UK manufacturing chemicals and plastics such as PVC and polystyrene. The BP Chemicals owned company BXL Plastics (originally Bakelite Xylonite) has a further nine factories in Britain producing polythene and a wide range of bottles, synthetic paper etc. BP Chemicals also owns a number of other manufacturing companies.

BP Chemicals' UK data processing operations have three ICL 2900 computer centres, each of which forms part of an order entry and invoicing network. A four-megabyte 2972 processor at Baglan Bay in Wales forms the hub of the network, and the other centres include a 2946 at Barry in South Wales, linked via an RJE into the 2972, and a 2956 in Hull, also about to be linked to the 2972. A major function of the network is transmission of bought ledger, sales, bank or cash information, into the 2972 installation.

Tapes

The network is in the final stages of completion and involves a total of 11 sites, distribution and manufacturing sites throughout the UK. Seven of these are currently online, with a further four to go online by the end of this year. An average of 25,000 entries a month are handled for each site, via ICL 7502s linked to the 2972 centre.

Three times a day the discs are accessed for orders and the data consolidated against the original input at each terminal. This up-

dates the order file and produces order confirmations and work instructions with the necessary documentation printed remotely back at each site. Customer despatch data, input via the 7502s online to the central accounting systems, triggers the invoicing cycle, invoices being despatched from the Baglan Bay Centre, although soon they will be printed online to each site.

Direct interfaces are also being developed into sales ledgers, statistics, and VAT returns. Transactions from other source systems and interactions with secondary systems such as budgeting, costing etc. are also interfaced into the main ledger systems at BP Chemicals. Tapes are produced for BP Trading's corporate VAT system.

BXL Plastics also has its own network with terminals for its nine UK factories linked into an IBM 4341, and connected to an IBM 3031 centre in Antwerp. This is further linked by RJE to the major European centres where BP Chemicals operates. Consolidation of accounts is carried out at each stage, so that Antwerp, for example, produces accounts for continental associates in a format which, together with consolidated accounts data from other parts of the world, is finally consolidated at Baglan Bay to produce a trial balance, profit and loss account and interim balance sheet every month, for all of BP Chemicals' trading operations.

Operating throughout the UK, BP Oil's function is the refining of oil and the manufacture and distribution of various oil-related products, such as petrol and lubri-

cants, via a combination of its own depots, marketing distributors, etc.

One of BP Oil's many DP-based functions is a distributed clustered network used by 38 depots, at which BP Oil receives sales orders and from which oil, petrol and related products are distributed. The network consists of 14 clusters of Datapoint 6600 minis at main depots, each linked to two or three other depots with Datapoint 2200 terminals. The 14 clusters are in turn linked to Univac 1100 mainframes at BP Oil's main computer and accounting centre.

Vetted

Operators at the depots deal with telephoned customer orders, keying in a mnemonic on the Datapoint to identify the caller. Appropriate quantities of the various grades of fuel entered as an order are vetted by the system to ensure that the order is correct against the typical ordering pattern of that customer in the past. The system is subsequently updated with customer delivery confirmation against delivery tickets.

This system is also used to aggregate oil stocks at each depot against regular readings taken from the tanks, and will soon integrate with a stock control and tracking system of oil product movement throughout Britain.

BP Oil also has some 50 marketing distributors in the UK. These are independent companies responsible for the delivery of smaller quantities of oil products to households, factories, farms etc. Most distributors have Ventek

SINCE last year, national movements and the rise in Opec prices have meant that BP has ceased to be a major seller of crude oil and has been forced to buy in order to supply its customers. Not only the processing turnover of refineries was affected; strategies had to be rethought, and a lot of financial decision-making had to be done.

BP management was obviously equal to the challenge, since the company managed to increase its gross revenue by £5,200 million. But to do this, it needed effective support from its computer accounting systems. The third in our four-part series describes these financial systems.

Datapoint 1500 terminals for data capture and send in floppy discs to BP Oil for the provision of an accounting service, including the production of customer statements of account. The development of a new enhanced system giving the marketing distributors order capture, invoice production and local online interrogation facilities, etc. is now well under way and due to be piloted shortly.

● Turn to page 15



The central communications console in BP Trading's computer services department, which receives data from hundreds of BP companies world-wide.

Controlling finances



From page 14

Behind such moves, designed to improve cash flow, are also systems such as those for BP Oil's accounts staff which have their own VDUs to update customer payments in real time. Such systems are essential as BP Oil is producing 4,000-5,000 invoices a day involving £11-12 million.

Like BP Chemicals, BP Oil also produces computer formatted consolidated group accounts, which form part of the accounting information input required to produce the consolidated group accounts for BP overall. Such accounting data from the hundreds of BP companies world-wide is received by BP Trading's own central computer department, either input by telex as a direct link into a PDP-11/34 used as a reception system, or received as a tape containing accounts data.

In addition, input is required from systems run by BP Trading for its own world-wide operations. Therefore, many accounting related systems as well as the general ledgers and integrated MIS systems are run on the three Univac 1100 mainframes operated by BP Trading's computer services department.

Typical of these is an international marketing data capture and processing system for aviation fuel and a similar system for marine fuel. Supply of aviation fuel and supply of marine fuel are international business operations controlled and invoiced by BP Trading, and systems were therefore designed to provide rapid validation and transmission of delivery data from remote sites around the world to BP Trading's central computer facility.

At the fifty or so large marketing sites at major airports, docks, etc. BP has installed ICL 1500 systems to collect and transmit the information on deliveries. The data is transmitted daily by remote batch communications to the PDP-11 reception system (in the case of smaller sites, by telex into the PDP-11).

Once a day, data from the PDP-11 is passed to the Univac processors for automatic invoicing. While, at the moment, these invoices are mailed by BP Trading, an investigation is currently taking place into means by which telex invoices may be generated and sent out automatically via the PDP-11.

As well as automatic pricing systems, payrolls run as databases and so on, there are a number of transaction accounting systems, run by BP Trading, handling such items as foreign payments. There is also a dedicated online entry system for petty cash, travelling expenditure, based on an ICL 2900.

Polled

The accounting key in BP Trading is the general ledger system, which handles 15,000 update records of the main trading ledgers a day. All input (from other systems) fed into the ledger system is represented in a control file by a list or series of slots containing a file name and checked against a master file reference system. All the files are constantly polled every day on an exception basis, for unpolled information that has not been accessed.

Validation is carried out automatically (the validation program takes the 64K words heavily overlaid to a total of 200K). Processed and accepted files are allocated in batches on a company by company, and currency by currency basis. Input is also established by date references so that at the end of each day a complete trial balance can be run with the total of all ledgers by company and by currency, which is expected always to be a zero balance.

Of approximately 3,000,000 records that are input to the ledger systems each year, 90% are computer created by other systems, while the remaining 10% will soon be input at transaction level via the ICL 2903, thus putting validation and data entry into the hands of the user.

To assist user departments, the ledger systems include a bespoke report generator using a large data dictionary. An auto scheduler, not just for accounts but for all user departments including computer operations themselves so that they can specify and schedule work entering the Univac, enables every item within the dictionary to be defined as either an output or an input event.

Supposing, for example, that accounts decides that marine invoicing must be closed on one date and aviation invoicing on another. The system enables all events to be linked in a chain, so that one event might trigger off 30 or 40 events, which in turn can trigger off 200-300 - based on the original data defined by accounts.

FIMS is BP Trading's financial management information system designed to provide actual income statements for each accounting quarter. It is being developed to include oil estimates which will provide financial forecasts and enable comparisons with actuals.

Investments

The main computer functions of the system are data collection; the control of data between FIMS and the general ledger system; a pricing facility; the maintenance of the FIMS database; the selection of data and its manipulation for reports; and the production of management reports.

BP Trading's finance department's activities involve investments in the inter-bank market in London, and foreign exchange deals in the London market - it handles almost as much foreign exchange, investment and cash as some of the major clearing-banks. The department has its own 1000 based system to aid control of all day-to-day cash handling, and this acts as a treasury for all BP companies throughout the UK who call up their cash requirements or make available cash surpluses each day.

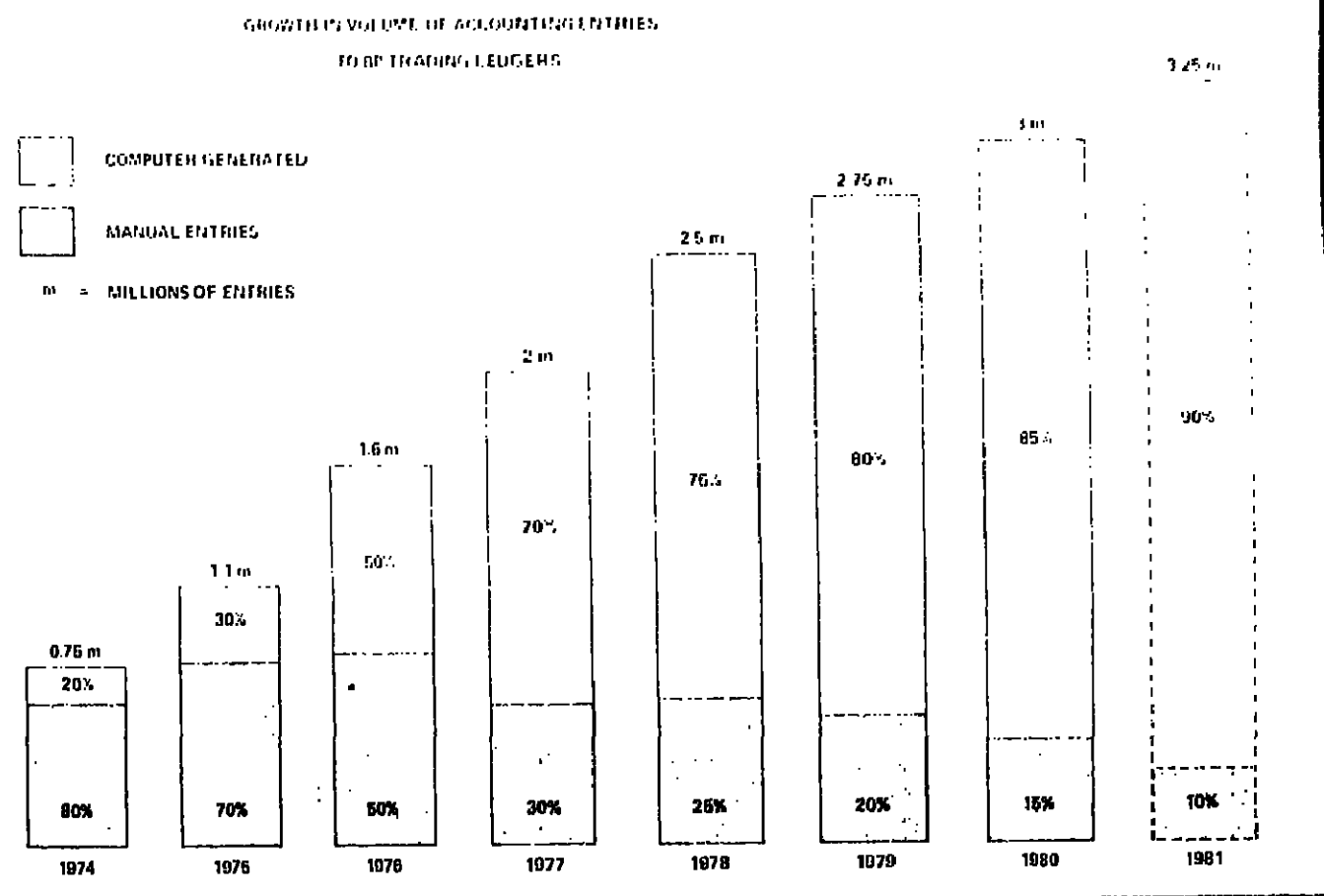
At a given time the cash ranges substantially, although monthly turnover averages the equivalent of £1,250,000,000 with holdings in terms of bank investments, local authority loans or short-term investments running at times over the £1,000 million level. Such sums can justify a dedicated system which was specified and developed as an online interactive system. Three areas are handled by the system: foreign exchange, investments and borrowings.

The financial director of BP Trading, Q. M. Morris, also has a VDU linked into the system, so that at any time he can access the system to determine the group's cash and banking situation.

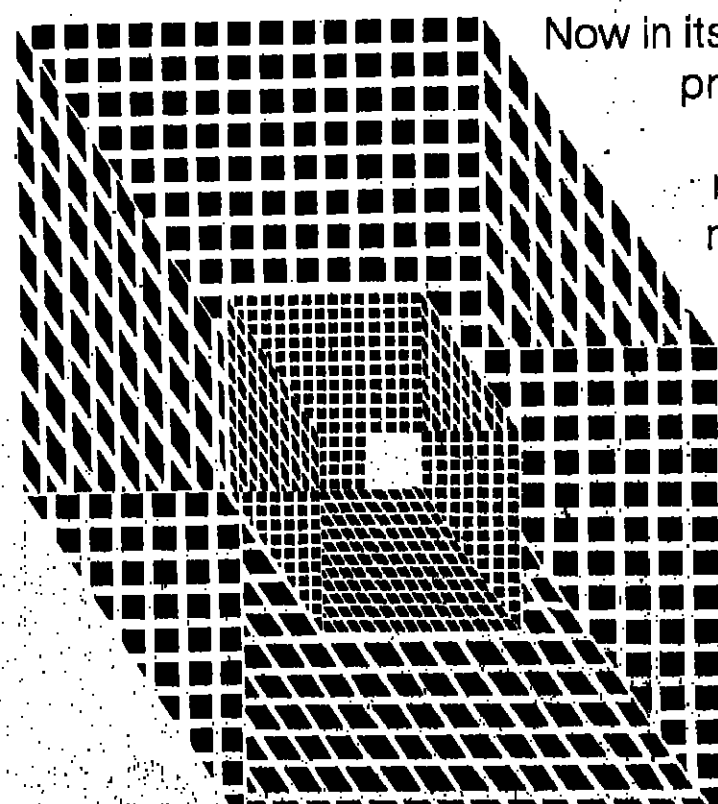
The system is used to present an overall picture of the cash flow of BP Trading and other subsidiaries, at the same time enabling individual aspects of cash to be looked at in detail. At the moment, input is manual, based on output information generated by other computer and manual systems.

A probable future development will be to link the system online into other financial computing systems in the UK. Payments that the department makes may also change, for BP is considering using the VDUs to input data into its bankers' computer systems, which would enable it to make payments using the bank's computer facilities. Such moves indicate that soon organisations such as BP may also be linked via their banks directly into systems such as Swift for international foreign exchange transactions.

Next week, the final article in this series will deal with original developments by BP on the computing scene.



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DATA ANALYSIS

by Rosemary Rock-Evans
Section I — Part 8
of our series describing a
systems development methodology

THIS series has now introduced the two main phases of data analysis — functional analysis and entity analysis. In this part, a new concept, that of attribute types, will be described.

Attribute types are determined during both entity analysis and functional analysis; they are also used by, and have a direct consequence upon, both of these stages. In the next article it will be seen, for instance, how the study of some attribute types can result in changes to the entity model.

Attribute types form the basis for the data items/fields which will be used in the database and programs.

Categories of Attribute Types

An attribute is a descriptive property or value associated with an entity. Thus an attribute type is the collection of all values of a de-

Attribute types — properties of the entity type

lined property associated with the entities of a given entity type.

A simple example of attributes and attribute types is given in Figure 1. Each attribute type in the example is describing some quality or property of the entity type.

1. Primary, or Basic. The basic facts which must be collected in order to carry out the functions of the business. They cannot be deduced or calculated from other attributes and must be collected during some business activity.

For example, the function "Patient registers with Hospital" may result in the sex of the patient and date of birth of the patient being collected. "Death of Patient" will result in the date of death being available.

Figure 2 gives examples of some basic attribute types which might be expected in the hospital example we have been using.

2. Secondary, or derived. These are generated from other attributes, as a result of the functions of the business. Note that we are not concerned at this stage about whether the attribute types have any permanence, ie, these attribute types may be stored on the database or they may just form the working storage of a program. The interest is in their existence and definition.

Some examples of derived attributes are given in Figure 3. The number of days the patient has been in hospital, for example, may be calculated by subtracting from the current date or date the patient was discharged, the date the person was admitted to the hospital.

It can be seen that the primary attribute types, as they are not influenced by the functions of the business, can often be determined during entity analysis, even though their purpose will not be precisely defined. The discovery of many of the secondary attribute types, however, will be dependent upon the results of functional

analysis.

Within the primary attribute types, a further type of attribute exists which is of special importance to analysis and systems design — that of the "key" or entity identifier. A key is the means by which an entity is uniquely identified; by which each entity of a given type can be distinguished from all others of that type. A key is really a design consideration, in that it is the means by which data about the entity can be retrieved. An identifier is inherent in the meaning of the entity. The analyst should not define an entity type if it is not possible uniquely to distinguish its entity occurrences.

Identifiers

The following methods can be used to identify entities.

1. Attributes of the entity. The value(s) of an attribute type or types which describe the entity type may be used to identify an entity. If one attribute type is used, the identifier is termed "simple". If more than one attribute type is used it is termed "composite". An example is given in Figure 4.

2. Attributes identifying other entity types. The identifiers of entities of one or more types may be used to identify another entity. Identifiers of this category are called "foreign". If the identifier of only one entity is used to identify another entity then the latter key must be made unique by using further attributes of its own.

It is possible, however, to identify an entity uniquely, using only

the attributes of other entities. Examples of these two cases are given in Figure 5.

Often system designers may already have invented keys for the entity type under study, but if it is the job of the analyst to choose an identifier, the one major rule which must be followed, whichever type of key is chosen, is that the values of the attribute types chosen must not vary over time. If this rule is not followed the entity will not be identified consistently over time, and chaos can result.

In general, foreign attributes are used as identifiers where the entity type only exists because other entity types exist: an operation cannot exist without a patient, a clinic session cannot exist without a patient, a membership of a specific "Patient is Operated on" relationship, which is used in part to identify the operation. It is not valid to identify an entity type with the identifier of another entity type if the one is not dependent for its existence on the other (ie if the relationship is optional) because, if one does not exist, the other cannot be identified. For instance, if patients were given an identifier which depended on the first appointment they had had, it would not be possible to refer to a patient who had no appointment scheduled.

Note that where the existence of an entity type is totally dependent on the existence of other entity types — for instance, a clinic session cannot exist without the clinic

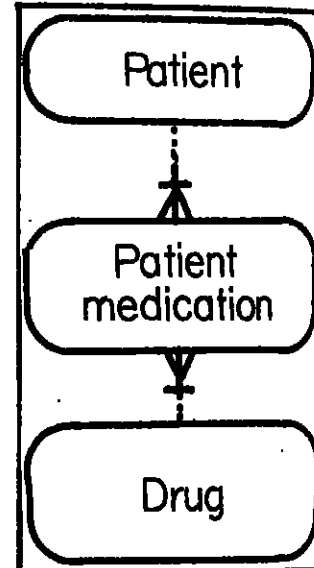


Figure 6. Intersection entity type.

— this can be represented on the entity model by the use of a stroke across the relationship line between the two or more entity types, see Figure 6. Note also that although the entity type is dependent for its existence on the existence of a patient, and a drug, the attribute types used to identify the patient medication need not necessarily be the identifier of each of these entity types. An entity type of this kind known as an "intersection" entity type.

Determination of attribute types

The determination of attribute types uses the rules for data analysis which state the restrictions within which analysis must take place (the parallel with language is shown in brackets).

1. Each notion in the environment must be classified as either an entity (noun or noun phrase) or an attribute of one entity (adjective or adverbial phrase) or a relationship between entities (verb or verb phrase); each element should be classified in only one way.

2. Only entities have attributes (only nouns have adjectives).

3. Only entities have relationships (verbs can only describe the connection between nouns).

One further rule may help in the determination of attributes:

4. An entity can have only one value associated with each attribute type, ie if Jim Brown was an entity within the Patient entity type, it would be invalid to have an attribute type of Height with two values 5ft 8in and 6ft 0in.

The contents of clerical files, forms, letters and reports, the results of functional analysis and the results of decision analysis will all reveal relevant attribute types.

All the basic rules for determining attribute types will be given in Part 9, since it is best to discuss the determination of attribute types while also discussing the problems which can result.

The definition of attribute types and the two types, primary or basic, and secondary or derived, have been described, and the use of attributes to identify entities. Part 9 will cover the determination of attribute types and some of the problems which result.

The Data Analysis methodology was developed at CACI by Ian Palmer.

Entity type	Identifier	type
Patient	National Health Service No of patient	Simple
Doctor	Hospital staff no	Simple
Clinic	Clinic no and clinic district code	Composite
Operating theatre	Room no, hospital wing no and floor no	Composite

Figure 4. Identifiers.

Entity type	Attribute types	Owner entity type
Appointment	NHS no of patient Date of appointment Appointment number (within date and NHS no)	Patient
Clinic session	Clinic code Session number within clinic code	Clinic
Team member	Team number Doctor/nurse no	Team Doctor or nurse

Figure 5. Keys.

Thorn TV Rentals has more than three million customers. When longer and longer postal delays caused overdue reminders to cross with payments, 85% of its correspondence was composed of accounting queries. An alternative accounting system was sought, and telecoms was the obvious answer. Here LAURA TATHAM describes the transition to the new regime.

Tightening up on rental accounting

A TELECOMS network that will improve the servicing of customer accounts and ensure more effective control of the monies paid each day into its showrooms has been brought into operation by Thorn TV Rentals, one of the UK's largest groups renting domestic televisions, video sets and videorecorders.

Thorn TV Rentals is the parent company and central accounting unit for Radio Rentals (1.75 million customers), DER (1 million) and Multibroadcast (350,000). The group has more than 1,000 showrooms throughout the country, where customers can see the televisions available for rent, sign contracts and buy accessories such as video tapes. They can also pay their weekly, monthly or quarterly rentals.

Under the previous regime, details of such payments were mailed from the showrooms to each of 13 area accounts offices, where the data was prepared for onward transmission to Swindon. It was because of long postal delays that it was decided to develop the new system.

"The old system worked satisfactorily on the whole," says director Bob Rumsey, "but when as much as five days passed before data reached us, we began to get very worried."

Irritated

"Our ICL mainframe issues reminders to customers whose payments are overdue, and with the postal snarl-up more and more of these reminders went to people who had already paid — sometimes several days earlier. Understandably, many got very irritated. In fact, at that time, about 85% of all the correspondence we handled was in connection with queries on accounts."

"So we began to look for an alternative that would solve the problem once and for all. Aside from improving our service to customers, we wanted a system that could cope with new applications."

Telecommunications was the obvious answer. The big question was what shape the new system should take.

There was, Rumsey recalls, no-one to turn to for first-hand advice, since no organisation had yet tackled a problem of this scale and complexity. So Thorn carried out its own study.

The resulting system is notable, not only for its novelty, efficiency and cost-effectiveness, but also for remarkably rapid implementation. Because Thorn's broad criterion was "excellence in each of several areas", its expertise, its system is "unique" involving the equipment of several suppliers.

Heart of the network is a Univac V77/600 minicomputer at Swindon, which is linked by dedicated 4,800-bps lines to 13 regional accounting centres, each of which has a V77/200 mini.

Thorn selected the Univac V77 minis "because we were impressed with this manufacturer's expertise in telecommunications and with the performance of these minis," says Rumsey. "It was obviously important to have the right capacity and complete reliability when we were developing such an extensive network."

Univac's ability to system design also ensured that all the various components in the highly complex network linked smoothly together.

The regional centres each collect data on disc from about 100 showrooms which are equipped with point-of-sale terminals, purpose designed by Data Terminal Systems. "DTS was one of the few companies that were prepared to cater for our special requirements at a competitive price," says Rumsey.

Largest order

There are about 1,200 of these PoS terminals in the system, linked via modems over the public telephone network and Thorn TV's own extensive private network to British Telecom DCE 1 autodialling equipment at the regional centres.

At each centre the V77/200 feeds its branch telephone numbers to a bank of DCE 1s, and these units activate the calls, check whether the response is a ringing tone or engaged signal, persist until a connection is made and, on completion of the call, clear down and go to the next branch number in the sequence.

The Thorn order is the largest ever placed for the DCE 1 units and Rumsey spoke highly of the service provided by British Telecom — or Post Office as it was when the project was initiated. There was a very early deadline for delivery and also some administrative reorganisation of one of the rental company's commercial areas.

This altered the requirement for dedicated lines "but they coped with everything and gave us marvellous support," says Rumsey. One of the most remarkable features of the system is that every PoS terminal in all showrooms can be reprogrammed remotely from the central V77/600 in Swindon. This is done by using the communications network in the reverse of the normal direction to transmit a long, very complex algorithm developed by the Thorn team.

A successful live exercise using this facility proved that it eliminates the delays and disruption that can be caused by changes such as alterations in VAT.

When such a change is announced, it is necessary to implement the new VAT rate immediately. Formerly this was not possible, and consequently the company had to bear the cost of the extra tax until customers' payment books had been updated.

Now, it is possible to adjust rentals directly as a tax variation comes into force. Rent reductions or increases can also be brought into effect easily and without delay after customers have been informed that such changes are planned.

Excellent

Software for the Univac V77s was written by Detwiler Thomas and Associates. "They were very co-operative and did an excellent job for us," is Bob Rumsey's verdict. Software for the PoS terminals was developed jointly by Thorn and Data Terminal Systems.

All monetary transactions at branch offices are recorded and processed on the microprocessor-based DTS point-of-sale terminals. The terminal keyboard has a numeric pad, colour-coded and labelled transaction keys and a further bank of keys, as yet unallocated, for use in future applications. Almost certainly one of these will be stock control. A

plasma display panel over the keyboard guides the operator. The terminal also includes an optical wand which show-room personnel can capture data encoded in a line of OCR-B characters on the payment slips in each customer's receipt book. This book is then inserted into the terminal for details of payments to be imprinted for the customer's information.

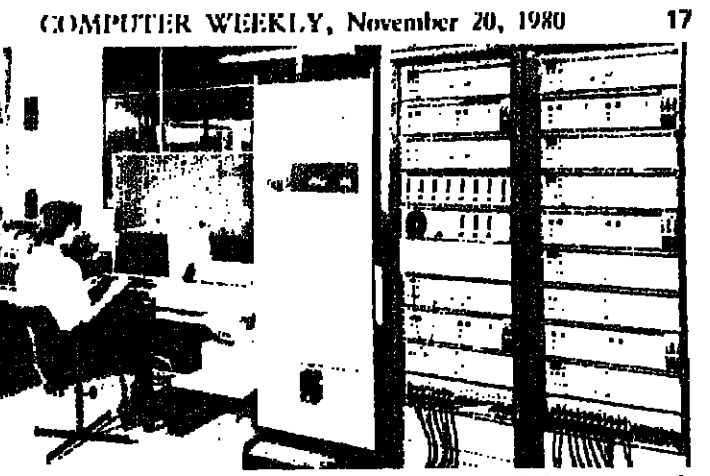
All transaction details are held in the PoS units memory for onward transmission to the regional centre in the evening.

At precisely 18.01 hours each day (one minute after cheap rates

come into operation) each regional Univac V77/200 begins to poll its branch offices via the DCE 1, using a disc containing the program and appropriate telephone numbers.

In readiness for this operation the branch terminal is set to the "transmit mode" at close of business. When transmission has been successful, a tick is displayed on the plasma screen. If for some reason transmission does not take place, a coded display indicates the cause.

In addition to recording the branch data, the regional V77/200 prepares and prints a consolidated



At each of 13 regional accounting centres in the Thorn TV Rental network there is a Univac V77/200 mini (centre) linked via a bank of British Telecom DCE 1 line equipment to up to 100 branch showrooms. The centre shown here is at DER's headquarters at Fekham, Middlesex, where each of 10 DCE 1s and their related modems handle data from up to 10 branches. The operator on the left is using the VDU and printer to monitor the system.

reconciliation and analysis.

Data from all 13 regional offices is recorded on disc by the Swindon V77/600 which also carries out reconciliation, consolidation and printing. This operation provides senior management with a nationwide picture of the day's cash movements.

Finally, the raw data on disc is written to ICL-compatible tape for batch updating of customer accounts by the ICL 1900 mainframe during the night. (This is shortly to be upgraded to a 2972.)

Thorn TV Rentals' new system

has successfully achieved its original objectives. Nevertheless, Rumsey is convinced it has only scratched the surface of its potential for yielding management information to be accessed via the existing inhouse viewdata system.

Already an international system of accounting on similar lines is being implemented, also based on Univac V77 minis. Soon counterparts will be operating for Thorn TV Rental subsidiaries in several European and Nordic countries and in the Republic of Ireland.

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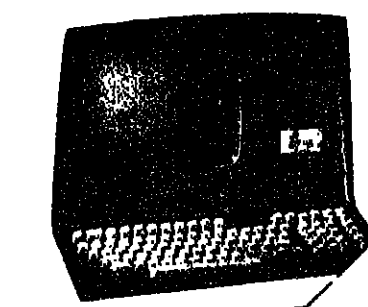
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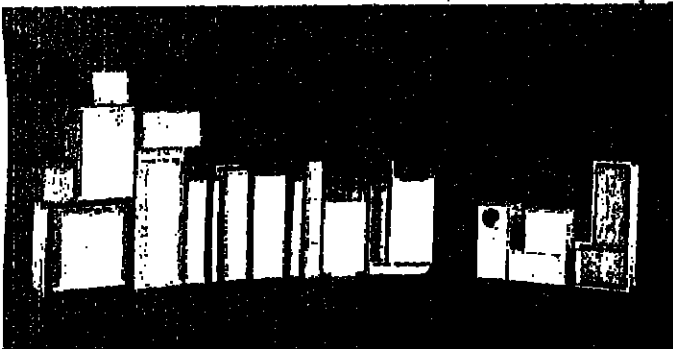
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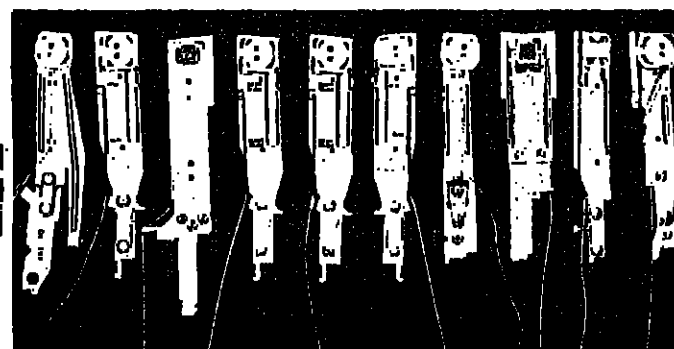


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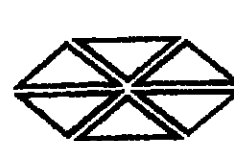
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Appointments

COMPUTER WEEKLY

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Box Numbers: Should be addressed to the
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Classified Rates: £16 per column
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Analysts and Programmers

ICL 2900 IDMS People

Contract opportunities abound for Analysts and Programmers with up-to-date experience on ICL 2900 equipment. If you would like to apply your proven skills to interesting new development projects, in various U.K. locations or overseas, we can offer long contracts commencing between now and the end of the year. Call Denise Fleming or Richard Kaluzynski on 01-491 4706 during office hours, or use 01-997 4144 and 01-840 1169 evenings and weekends.

	Ref.	
IBM DOS/VS COBOL Programmer with CICS	253	Holland
IBM 3033 MVS +IMS DB/DC COBOL Programmer	252	C. London
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IBM OS/MVS senior PL/1 Programmers with DL/1 and CICS for long contracts	246	Dublin + Holland
IBM MVS COBOL and CICS Programmers	243	Yorks.
H'WELL COBOL Programmers with TDS/IDS	241	City
IBM System 3 RPG II Programmers	254	Holland

For details of these and other contract opportunities ring Richard, Denise or Moray on 01-491 4706 (daytime) or 01-408 0280 (evenings and weekends).

KNIGHT OPERATIONS houses a full recruitment and contract service to the computer industry. We've been around for a few years now, and if you have too, and you're looking for contract or permanent employment, give us your information! Call 01-491 4706 or write requesting an application form.

We have several interesting contracts outstanding in various areas of the country. Why not ring and see if we have any in your area?
Perhaps it's time to secure a more rewarding job in time for Christmas?

This week's latest Permanent Vacancies

Operator **EC3**

If you have RSTS experience our clients would be interested in seeing you for their PDP 11/70 installation. Good benefits await the right person, and excellent future promotion prospects. Three-shift system.
Salary: to £6,000 inc. p.a.

Shift Leader **Berks**

A vacancy has arisen for someone with RSTS/E experience to supervise a shift of three. You will preferably have previous experience at this level and be looking for a company offering better prospects. Split day shift. Sports and social club.
Salary: c. £7,000 p.a.

Operator **SE1**

A new installation is in urgent need of an experienced IBM System 34 Operator. Shifts to be negotiated. Friendly atmosphere and good perks. Some overtime available.
Salary: c. £6,000 p.a.

Always RELY ON KNIGHTS! Rachel Martin and Theresa Farrell are here to give you details on the above and other vacancies.
Sue Smyth, Joanne McKeggle and Elaine Revell are always happy to advise you on contract opportunities.

Why not call us on 01-491 4706?

Knight Computer Services Ltd.,
14 Old Park Lane, London W1Y 4NL.
Staff Services Division of BOC Datasolve Group
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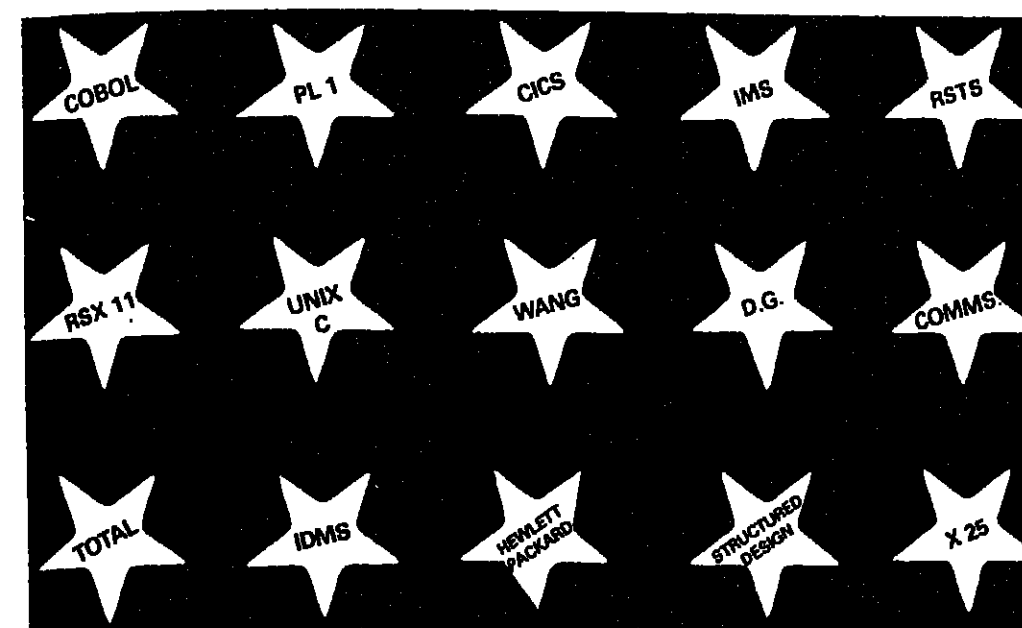
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OR WHEN BUSY 01-439 3411

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BIG TAX SAVINGS



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Salaries range from \$20,000 to \$35,000+, with big tax savings in most instances.
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New Zealand -Auckland

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FELTEX is one of New Zealand's major commercial and industrial organisations. They are embarking on major computer development using PDP equipment and are committed to applying the latest technology to practical commercial situations. They wish to recruit:

Systems Analysts or Analyst/Programmers

Feltex are seeking computer professionals who have worked in a manufacturing, marketing or financial environment. Ideally you will have: • A minimum of three years experience • Sound BASIC and/or COBOL background • A record of successfully implementing systems • Experience in an interactive environment.

BENEFITS New Zealand offers a quality of life that is sought after by many more specifically Feltex offers: • Top New Zealand salaries • Stimulating career challenge • Relocation expenses on permanent employment • Return air fare on contract assignments.

Final interviews will be conducted by the Group Data Processing Manager in the week commencing 8 December. In the first instance however, please telephone Chad Stolper of Prescott Computers Limited on (01) 434 2698/9. If you prefer write to him at:

Prescott Computers Limited
43 Conduit Street London W1R 9FB

Will you be part of Europe's most advanced Custom IC Design Facility

At the Wembley site of Marconi Electronic Devices Limited, we're creating what will be the most advanced VLSI design facility in Europe - A centre dedicated to the production of specialist micro devices for a wide range of customer industries.

Device design is supported by extensive computer-aided design systems based on Appligon Graphics Systems, DEC 400 Multi-access System and the powerful VAX 11/780. Because of the continued growth in demand we now have the following opportunities for men and women, all of which are new positions:

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With strong Fortran and Machine Code experience, to work closely with Logic and Layout Designers on a wide range of specialist software. We're looking for effective and open-minded problem solvers who have the ability to keep up with the ever-increasing complexity of Micro Device Design. Applicants should be of graduate calibre with a heavy electronics background and at least 2 years' CAD experience.

Salaries will be negotiable and extremely competitive and will be enhanced by a top-line benefits package, with relocation expenses paid where applicable.

If you feel that you could provide the quality of support we're seeking, please write with brief career and personal details to **MRS. K. MORTON, Personnel Officer, Marconi Electronic Devices Limited, East Lane Wembley, Middlesex. HA9 6PP, or telephone 01-904 4111.**

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£6500 to
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Interested? Send coupon or phone

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YRS ANALYSIS _____	YRS PROGRAMMING _____
MACHINES USED _____	
JOB SOUGHT _____	LOCATION _____
SALARY _____	SALARY REQUIRED _____



DATA RESOURCES AGENCY
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(24 HOUR ANSWERING)

Central Chambers
11 Bothwell Street
Glasgow G2 8LY
Tel: (041) 226 4812

RECRUITMENT AGENCY

MARK IV

Permanent Staff

Tangent Computer Service is a successful Software Support organisation with diverse U.K. and International activities. The company's ability to select, retain and develop the talents of skilled professionals has been an important factor in its growth and has enabled an excellent reputation to be maintained.

Expansion in both our U.K. and U.S.A. Companies is such that we require to augment our MARK IV teams with:

ALL LEVELS OF PERSONNEL WITH MARK IV EXPERIENCE

Attractive remuneration will be offered to suitably qualified personnel who have a mature and professional approach to their work.



For more information telephone
Alan King
TANGENT COMPUTER SERVICES
102/106 South Street
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Tel: Rimford 750201

(3840)

Recruitment **LOGISTIX** in Informatics

Junior Applications Programmers

Rhineland Germany: Salary 14K

A German Chemical and Pharmaceutical Company has requested LOGISTIX to identify and recruit Applications Programmers and Analysts/Programmers for its recently upgraded IBM installations. The Company is situated in an area of outstanding natural beauty and within three hours' drive of six neighbouring countries! It is essential that all applicants have a minimum of 2 years' COBOL, Assembler or PL/I programming experience although the hardware involvement is irrelevant, since excellent in-house training and manufacturing courses will be provided. The Company is planning to implement an SNA network during the next 2 years and you will therefore be directly involved in development work. These positions represent an outstanding opportunity for career-minded professionals aged 23-28 years to enhance their technical skills whilst simultaneously enjoying the diverse cultural benefits of another society. Ref: L/47/A

Mini/Micro Software Development

Beds/Camb.: Salary to £10K

Our client is a highly respected Systems and Software Supplier having its Research and Development Facility in a most attractive East Anglian location. Current requirements are for Development Programmers offering a minimum of 18 months' Basic or Assembler programming experience on any mini-computer or micro-processor. These positions will appeal equally to those with a scientific/academic computing background or commercially inclined Programmers. Offering a comprehensive range of in-house hardware, unrivalled development aids are available for ambitious, career-minded individuals. The salary and excellent ancillary benefits represent an outstanding opportunity for those keen to participate in "state-of-the-art" software and firmware projects. Interviews can be arranged both locally and in London. Ref: L/47/B

ICL Applications - Canada

Full Contract Package

We are seeking several Programmers and Analysts/Programmers for 6 months' renewable contract positions in several Canadian Provinces (not East Coast locations). The required interviewees will be those with either MTS or IDMS software experience. The applications are inventory stock control and order entry processing. Previous programming development in these areas is an obvious asset. In addition to an excellent contract rate, accommodation and travelling expenses will be paid. Initial interviews will be held within seven days of the appearance of this advertisement. Late 1980/early 1981 start dates are envisaged. Ref: L/47/C

S/W Designers & Engineers

Swindon: Salary to £11.5K

One of Europe's leading communications companies urgently requires Programmers and Engineers to join its Communications Development Group. Successful applicants will have 2-3 years' mini-computer or microprocessor Assembler experience. Some positions require active and regular pre- and post-sales support, whilst others demand a knowledge of not only software but also firmware development techniques. Of particular interest will be those candidates currently engaged on real-time military applications or, alternatively, have exposure to System X orientated processors. Ref: L/47/D

Datapoint Programmer/Analysts

Belgium: Salary to £16K

Our client's recently established Benelux subsidiary is seeking several Programmer/Analysts to join its permanent payroll. Respondents must offer a minimum of two years' programming experience and a minimum of twelve months on Ventek Datapoint hardware. On-line and teleprocessing skills are particularly valuable and will reflect in the salary. A proven ability or strong desire to act in both pre-sales and customer support roles is a decided advantage as are personal communication skills. It is envisaged that these appointments will be taken up in February, 1981. First interviews will be held in London and short-listed candidates will be invited to Belgium. Ref: L/47/E

Software Support - Graphics

Stth Manchester: Salary to £10K

One of the market leaders in the development, manufacture and sale of graphics terminals and instrumentation devices has a requirement for Analysts/Programmers and Project Leaders for its Manchester Regional office. Successful applicants will be involved in pre-sales support, the installation of software packages and training customer personnel through the medium of seminars and video demonstrations. Candidates should have at least two years' FORTRAN or Assembler programming experience, preferably supplemented by industrial CAD/CAM involvement. It is anticipated that you will have an appreciation of hardware micro-computer software techniques. Particular hardware experience is not relevant but those familiar with the products of Tektronix, Computervision or Vector General will be especially welcome. Ref: L/47/F

Micro Support

Central London: Salaries to £8K + Car

Our client is a leading Micro-Computer Manufacturer, with offices in both Inner and Greater London. The rapid increase in sales of its Business Systems has created vacancies for additional Micro Service Engineers and Software Support Programmers to maintain and enhance its reputation for outstanding post-sales hardware and software support. As a Micro Service Engineer you will support the increasing customer base of micro-computer systems and terminal products. Full training will be given to young, ambitious engineers with an in-depth knowledge of Electronic Engineering and Microprocessor techniques. Software Support Programmers should offer at least 18 months' BASIC or PASCAL programming experience on any leading mini or micro computer. Interest in Personal Computing will be a distinct advantage. For all positions, candidates must demonstrate the ability to liaise with customers and solve any problems which may arise both quickly and professionally. Ref: L/47/G

Logistix, 10 Grenville Place London SW7 4RW

01-373 3063



Telex: 28400

(3878)

ANALYST PROGRAMMERS and PROGRAMMERS

East Midlands
Salary to £8,000 per annum
and index linked

Our clients are a major consultancy providing services both at home and overseas.

Due to continuing expansion they seek to strengthen their existing team based in the East Midlands.

You should offer experience of at least eighteen months as a Programmer or Analyst Programmer in a commercial environment. Experience of ICL System 10 Assembler, Cobol or RPG II will be of particular interest.

In this highly professional environment you will rapidly advance your skills in the following areas:

Real-time mini-computer techniques
Development from investigation to implementation
User Liaison

The broad range of commercial applications.

You will enjoy much variety in your work and will have the opportunity to quickly progress to full project responsibility.

Salaries are highly competitive and increase automatically with inflation. Relocation assistance will be considered where appropriate.

Male or female candidates should contact Patrick Convey quoting reference number CW290.

**COMPUTER PERSONNEL
CONSULTANTS**
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CONTRACTS

IS 1981 GOING TO BE YOUR YEAR?

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URGENT REQUIREMENTS

ICL 1900 COMMS. SOFTWARE PROGRAMMER
Knowledge of Comms. Manager, Line Protocols, Term, Executives, Maximp, Datadrive, G11 COBOL

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Vacancies exist in the following areas:

1. Superstructure
2. Base
3. IDMS Service
4. T.P.

£600-£600 p.w. tax free + acc + Flights

On-going requirements for programmers, analysts/programmers with good JCL 2900 background, including IDMS and/or T.P.

NORTH WEST + MIDLANDS

JAN., FEB., MARCH, APRIL, 1981

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2900 COBOL PROGRAMMERS

**2900 T.P. +
IDMS ANALYSTS/PROGRAMMERS**

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PROGRAMMERS**

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The above positions to start throughout the New Year with long + lucrative contracts.

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Talk to Sue, Paul, Derek or Tony

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ADDRESS _____

TEL DAY _____

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April 1981

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IBM 370 COBOL CICS Programmers
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IBM 370 Programmers
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IBM 370 DB/DC Designers/Analysts
ICL 2900 VME/B Programmers/Designers
Burroughs B6800 Programmers
UNIVAC 1100 Exec 8 Programmers
Banking/Insurance Analysts/Designers
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The above is only a small selection of the many requirements we have to fill throughout the UK and overseas.

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Guide

The people who ask 'What recession?'

THE age of the independent contractor has arrived. More and more data processing professionals are turning freelance, successfully selling their talents in an open market, a trend that is being followed by accountants, engineers and even senior management in industry.

Until recently, freelancing was frowned upon and the supply of external resources to computer users was the province of software houses, offering permanent staff on a time and materials basis.

This changed radically when agencies were formed specifically to handle the affairs of independent contractors. The software houses have found it progressively more difficult to compete ever since.

Some software houses have now dropped out of this marketplace completely, concentrating on in-house project work, unable to match the agencies on the price and range of skills on offer.

Philosophy

But this is on the supply side of the equation. What about demand?

Although minor geographical differences do exist, the general philosophy of users throughout the UK is that

freelancing in the DP industry is becoming increasingly popular. Not surprising when demand is so high that contractors are asking "What recession?" VIC GROVES discusses this situation and offers some advice to would-be independent DP professionals. Groves has spent several years in the computer industry: in 1975 he set up his own company, Quadrant Computer Services, which soon became a leading UK software house. In 1978 he left the mainstream of the software industry to develop a secure market place for freelancers, with the establishment of VNG Professional Services Ltd.

computerisation will help their companies out of recession. Redundancies may be taking place in other departments, but contract staff are still required within data processing.

In addition, companies breaking new technical ground are usually prepared to buy expertise. Enforced situations such as hardware changes mean that many companies have no choice but to supplement resources, and the demand from overseas has never been higher.

In summary, contractors with a solid base of experience and a good armoury of skills are still very much in demand. Contract length is on the increase as is the interest content of the work. Many contractors placed by my company recently have moved

into leading edge development work. One first-timer made his first job move for ten years!

But, if you are a contractor without a contract now or for much longer, or if you are a frustrated employee itching to make the break into your first contract, you will doubtless be wondering how to find such long-term security and high job satisfaction.

Register

First, prepare yourself properly so that your skills and strengths are represented clearly and comprehensively to a third party, via a CV that does you justice. It is disconcerting to receive a badly laid out single page career summary from someone claiming many years' experience.

Secondly, register yourself with two or three agencies that really know the business, in which you can trust, and have confidence.

If you are a first-timer, there is another matter to look at before registering. Establish what advice and guidance is available on how to set up a limited company, and so on — a booklet, perhaps?

Now let's look at the future. The recession is causing a shortage of work in certain areas, aggravated by some contractors having limited skills and not being prepared to travel, or move to where the work is. However, within the major computing centres of the UK, experienced professionals with good expertise who can present themselves well have an assured future.

When the recession works through, the demand for new systems must increase further and the current shortage of DP staff will get worse (or better, depending on which way you look at it). It is fair to predict that 1981 will see a significant increase in demand for contract staff.

My company's order book has never been fuller and we frequently find ourselves asking the question "What recession?"

We need more people.

Victoria Appointments Limited

THE PERSONAL PERSONNEL SERVICE

We are always looking for Professional Freelance Programmers, Analyst/Programmers and Systems Analysts with at least 4 years' sound experience. For assignments in the North-West of England and Holland.

We can offer you:

- Competitive Rates.
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- And of course all the other facilities you can expect from an established organisation with a high reputation.

For further information and details send your CV FREEPOST or telephone

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FREELANCER!

Contact Quadrant for Contracts

Quadrant, a leading Northern Software House, is now able to offer Freelancers exciting contracts at exceptional rates.

COBOL IBM PROGRAMMERS

We have many positions available for COBOL programmers with an in-depth knowledge of CICS and DL1 — all levels of experience will be considered.

DESIGNERS

Experienced DL1 Designers required for interesting long term contracts in the Lancashire area.

COBOL ICL PROGRAMMERS

Excellent long term contracts available for experienced ICL COBOL programmers with an in-depth knowledge of VME/B.

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Exceptional long term contracts for Systems Programmers who have an in-depth knowledge of IMS — DB/DC. Excellent rates will be offered to the successful candidates.

COBOL/ASSEMBLER PROGRAMMERS

We have a number of positions for ASSEMBLER/COBOL programmers with a knowledge of CICS — who have at least 2 years commercial experience.

PROGRAMMERS

An opportunity to gain IMS experience if you have an in-depth knowledge of VME/B — we will train you in IMS.

ALL THE ABOVE POSITIONS ARE ALSO OPEN TO PERSONS SEEKING PERMANENT EMPLOYMENT

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Contracts — North East
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MYRIAD

NEW PROJECTS

NEW JOB . . . SYSTEMS ANALYSTS
NEW MACHINE . . . IBM 4300
NEW YEAR . . . YOUR FUTURE

The company is a highly successful division of a major international organisation and is about to invest heavily in Data Processing next year with new hardware and development projects. To spearhead this venture, an experienced Systems Analyst is required to undertake projects from feasibility. Offering a wide range of interesting applications, this position requires initiative, good liaison qualities and the experience of previous project success.

Although based in the North West of London the position will involve travel to remote operating units, where a car allowance contributes to an attractive salary package of £10,000.

Ref: NI/2011

NEW IBM INSTALLATION

ANALYSTS AND PROGRAMMERS
Middlesex To £10,000

Additional Analysts and Programmers are required now to enhance the Systems and Programming Team of a major organisation able to offer a secure future and positive career development.

A range of interesting and varied systems are scheduled for development and implementation on a new IBM 4331 to be delivered in 1981.

PROGRAMMERS should have at least two years' experience programming in COBOL or RPG II on IBM or compatible hardware.

ANALYSTS should possess a programming background and over two years' analysis experience.

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Ref: CI/1311

(3618)

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(3618)

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£8-£10,000

The development of new products for advanced Data Management and Interactive Transaction Processing Systems, has created additional vacancies for systems software programmers with our client — a major American computer manufacturer.

These positions will appeal to people who enjoy software design and development in a small project team environment where individual creativity and contribution is recognised. If you are able to offer ASSEMBLER programming skills together with some COBOL knowledge, then you can look forward to a role involving significant project responsibility and technical challenge.

The company, located in modern offices easily accessible by both public and private transport, is able to offer attractive associated benefits in addition to a competitive-commencing salary.

Ref: NW1/2011

A STEP FORWARD

FOR SENIOR PROGRAMMERS WHO WANT TO MOVE INTO ANALYSIS
FOR PROGRAMMER/ANALYSTS WHO WANT TO BE ANALYSTS
FOR SYSTEMS ANALYSTS WHO ARE READY FOR MORE RESPONSIBILITY

- Salaries to £9,000 p.a.
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- micros, minis and IBM 370
- Bonus / training / relocation

Our client is a large company operating in the leisure and related areas. They depend heavily on computers and offer a secure future with plenty of technical challenge and good career development opportunities. All senior data processing positions are filled by promotion, not by recruitment.

They are now seeking experienced data processing staff to contribute to the development of new batch, on-line and database systems.

The main recruitment requirement is for analyst/programmers. If you have programming capability in BASIC and can offer either COBOL or PL/1 as a second language, the company will give you the necessary training, exposure and experience in systems design. If you have current systems design experience, so much the better.

If you are a systems analyst working on commercial systems development, you could play a significant role in advising junior staff and planning new systems.

The department has an IBM 370/138, two PDP11 minis and an increasing number of Cromemco micros. There is a wide variety of up to date software including interactive program development.

These are first class career opportunities offering a secure future with a large technically advanced company.

Salaries are very good and there is a package of worthwhile benefits including a substantial bonus, WPA sickness scheme, luncheon vouchers, generous staff discounts and help with relocation costs where appropriate.

For more details about the company and its future plans, please call Sue Blundell or write to her at the address below.

271 High Street
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Contract Staff



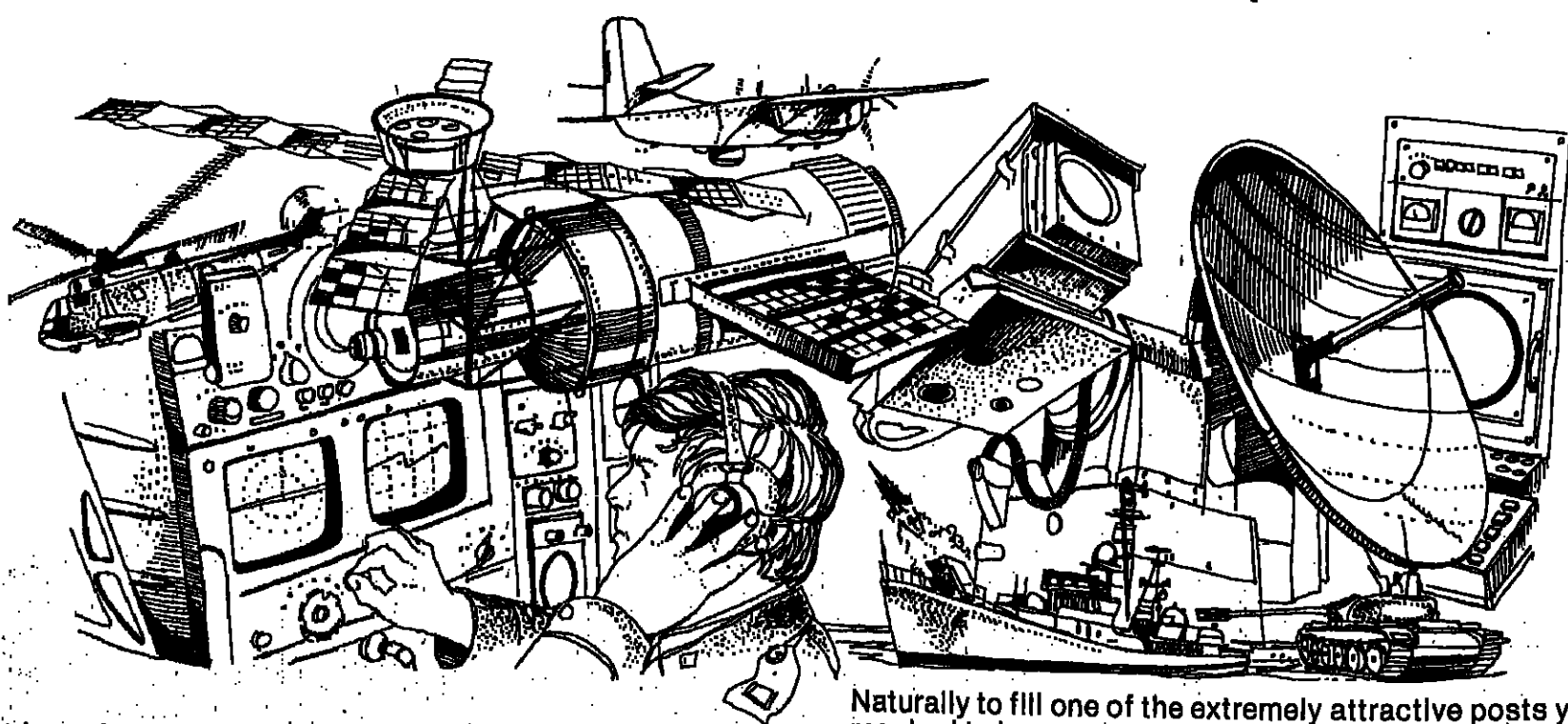
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RECRUITMENT

(3620)

REAL TIME SOFTWARE DESIGNERS

Salary to £12K plus car allowance
LONDON / HOME COUNTIES

Our Clients are the U.K. subsidiary of a well established American systems house operating in the scientific field with a considerable reputation for its technical excellence. Not only have they already opened two major offices close to London but a third is planned for early next year with the intention of establishing centres throughout the U.K. at a later stage.



What is certain to attract you is their well established customer base in the following fields:

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PROCESS CONTROL
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TELEPHONE: 01-353 7141 (24 HOURS)

Naturally to fill one of the extremely attractive posts you will be required to have an excellent educational and technical background with good experience in real time systems and assembler programming.

In particular our clients value:

- * Familiarity with such mini-computer systems as DEC, GEC, SEL, DG, HP or GA.
- * Firm knowledge of high-level technical scientific language e.g., CORAL, PASCAL, FORTRAN or RTL.
- * Experience in micro-computer systems.

We are looking for high-grade staff and the financial rewards are excellent as is the demonstrable career progression. This could be your chance to join a dynamic team of first class professionals who are committed to building up a wide range of professional services. Remuneration, depending upon experience, will naturally be enhanced by the normal benefits expected with an established organisation. Where travelling is required a generous car allowance will be paid.

For further information or to arrange an interview please contact ROY HIGHFIELD quoting reference CW2011.

Hutton

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Brussels 010 322-640 7151/71 Avenue Louise 327, Boite 4, 1050 Bruxelles

Specialist Computer Recruitment Ltd

DIRECTOR OF COMPUTER BUREAU

The Computer Bureau is operated as a service unit for both academic and administrative departments. Interactive computing facilities are supported by an IBM 4341 computer with 2-Mb of main memory and a Digital Equipment VAX 11/780 with 1-Mb of memory.

In recognition of the increasingly important role of computers and the wider requirements for external services, the College has under consideration a proposal to incorporate a Regional Computing Centre in the Bureau.

Applications are invited for the vacant post of Director. Candidates should have extensive experience in the management of a major computing facility, preferably in an academic or research environment and should also have appropriate professional qualifications. The salary scale is: £14,932-£17,206 per annum.

Further particulars and application forms are available from the undersigned to whom completed applications should be sent to arrive not later than Monday, 18 December, 1980.

M. F. Kettlehar
Secretary
(3888)

Thames Polytechnic

Computing Services Centre
**Computer
Applications
Adviser**

The Computing Services Centre and the School of Architecture and Landscape invite applications for a post of Computer Applications Adviser. The applicant should preferably be an applied with training in computer science and experience of teaching applications of computing to architectural students. The post is temporary for one year in the first instance. Salary scale: £2282-£2942 inclusive.

Further particulars and application forms from the Secretary, Thames Polytechnic, Watlington Street, London SE18 6PP, to be retained by 9 December, 1980.

SYSTEM 34 RPG II

Contract Programmers
urgently required for London
assignment.
TEL. 01-606 1738

UMIST CONTROL SYSTEMS CENTRE RESEARCH ASSISTANT

REF: CSC/218/80. Applications are invited for the above post to work on the development of new software techniques for the on-line interactive design of control systems. A knowledge of control system design methods would be valuable but software development experience is more important. The proposed research would be appropriate for a suitably qualified candidate interested in registering for a high degree. Salary will be in the range £4795-£5600 per annum. Requests for application forms and further particulars, quoting the above reference, should be addressed to the Registrar, Room 116, UMIST, PO Box 160, Manchester M60 1UD. The closing date is 5 December, 1980.

Programmers Customer Service- A lot more than just Programming

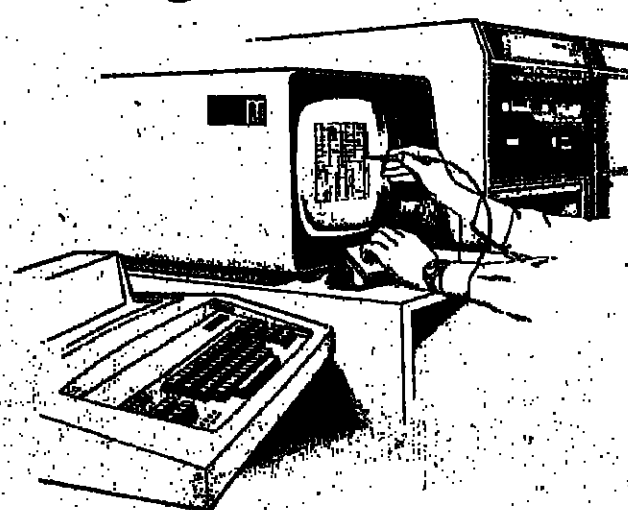
Customer Service and Software Maintenance are becoming an increasingly important function within modern progressive computer systems companies. Racal-Redac Ltd., are recognised as world-leaders in the field of Computer Aided Design and we have attained this enviable position because of our capability to develop and maintain advanced CAD Systems.

Furthermore, the growth of customer service has resulted in the development of unique career paths for Software Specialists. Our Programmers are in daily contact with our customers in order to ensure the problems are rectified quickly and that his requirements can be recognised and acted upon efficiently. The work is certainly interesting and varied and will appeal to you if you:-

- * like defining and solving problems
- * do not wish to limit your horizons to just software
- * like meeting customers at customer site

The work will inevitably involve travel both within the U.K. and Europe and opportunities may exist to work in the U.S.A. for short periods.

Applicants should hold a relevant degree of HNC qualification and have at least two years experience, preferably in a Customer Support environment.



Salaries and employment benefits are commensurate with the responsibility of the positions and career prospects are excellent within Redac, one of the fastest growing companies within the Racal Electronics Group.

Please apply with details of age, experience and current salary to:
Brian Ashcroft
Personnel Officer
Racal-Redac Ltd.
Newtown, Tewkesbury
Glos. GL20 8HE
Tel: 294161



Britain's fastest growing electronics group

RACAL

01-606 1738

Our Client, a medium-sized International Lloyd's Insurance Broker, has recently installed an IBM 4331 computer system. This is a prestige installation, that will fully exploit the power and facilities of the 4331 in order to provide a service, vital to the continuing growth of this old-established company. All systems and programs are being written in-house, and this is estimated to take approximately 5 years.

A small team has already commenced work, and they now require two additional Programmer / Analysts to join them as soon as possible. The essential qualifications are good COBOL, high motivation, enthusiasm, flexibility and willingness to work hard, in order to bring success to the project. Experience of financial systems, IBM hardware or interactive programming would be an advantage but is not essential.

This is a warm and friendly company that will provide you with the opportunity to work in a small team, writing interesting and unusual programs for the latest IBM hardware. All necessary training will be provided and the general working conditions would be hard to better.

R & D SOFTWARE MANAGER AND PROGRAMMERS

SALARIES IN TOP BRACKET

plus

OTHER ATTRACTIVE BENEFITS

U.K.'s leading manufacturer of Data Acquisition and Control Systems has the above senior vacancy, and also vacancies for programmers.

The successful senior applicant will have a proven track record in Assembly-Code and FORTRAN and will be required to develop system software for the Company's range of Data Acquisition and Control Systems. Experience with DEC RT-11/RSX-11M an advantage.

Programmers are required with similar experience.

Apply: **INTERCOLE SYSTEMS LIMITED**
Tel: Chislehurst (04215) 4727 (3817)

CONTRACTS

LONDON—START EARLY JANUARY

ANALYSTS AND ANALYST PROGRAMMERS

Minimum 2 years' Cobol essential. Experience of one or more of the following will be an advantage.

- * On-Line Systems
- * Interactive working
- * Hewlett Packard HP3000.
- * SPL
- * Image or other database knowledge

8 month contracts to start — may be extended to 18 months.

Please reply A.S.A.P. to:

ALLAN ALEXANDER 01-822 2445, office hours or 01-888 7242

harris baldry consultants limited
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101a Clapham High Street, London SW4 7TB (3833)

SENIOR SYSTEMS ANALYST

An experienced data processing professional is required by this production division, which is part of the Sterling-Winthrop Organisation based near Sheffield, engaged in the manufacture of d.i.y. industrial and domestic hygiene products.

Using an IBM System 34 we are currently engaged on computer projects which require new operating and system philosophies being generated and have new projects coming on stream. Thus it has been decided to create this position within our small data processing department.

The person appointed will report to the Data Processing Manager and deputise for him as required, he or she will be expected to make an early effective contribution and will therefore have experience of IBM G.S.D. equipment ideally in a manufacturing environment. The job will involve the development and implementation of important new projects including a major extension and development of an I.P.N.C.S. package including provision of on-line screens plus the implementation of other production related systems.

This is a senior staff position offering an attractive salary and terms of employment commensurate with those expected from a large organisation.

Please write or ring (Sheffield 487171, Ext. 18) for an application form to Roy Glenworth, Personnel Manager.

STERLING PRODUCTION DIVISION
Chapelton
Sheffield S30 4YP (3613)

Sterling Production Division
(A member of the Sterling Winthrop Group)

PROGRAMMER LEADING TO ANALYSIS £8,000

SUNBURY — MIDDX.

1. EUROPEAN ACCOUNTING SYSTEM — DOS/V8 —POWER
Min. 3 years, COBOL/ASSEMBLER.
To work on IBM 370/145, additional experience in Accounting systems and Communications desirable. To maintain and develop existing accounting system and future communication interface with mini-computer network.

2. EUROPEAN COMPUTER NETWORK
Based on DATABAB D18/40s with min. 3 yrs. COBOL experience.
To develop system currently operating in Germany for other major E.U.R. centres. Some travel will be required, and ability to work on own initiative away from base. A working knowledge of German/French will be useful.

There is a requirement for an interchange of roles in the above jobs and therefore an overlap of experience will be considered. These new positions offer an opportunity to develop skills in analysis and to be involved in development using the latest techniques building up a new communication network.

Write to:

JEFF MALLINDER
All Express International Agency Inc.
51 Staines Road West
Sunbury-on-Thames
Middlesex TW18 7AH
or telephone Sunbury (09327)
88312/Guildford (0433) 71507 (evenings) (3817)

GROUND FLOOR OPPORTUNITY

IN RPG 2 PROGRAMMING

— SLOUGH

UP TO £6750 + BONUS SCHEME

Manpower is a large international organisation with 90 UK offices. We undertake contracts for clients in every section of industry and commerce covering all types of work including office, industrial and skilled.

Recent years have seen our business expand rapidly, and to assist in managing this growth, an IBM System 34 has been installed. Our first major application is nearing completion and a range of business systems is under review for urgent computerisation.

This post is in a young expanding department where you can have a real opportunity to influence events. You should have at least a year's experience of RPG 2 on System 34, 32 or 3. All replies will be carefully considered. A knowledge of accounting systems and payroll useful. Preferred age range 20-28. Major company benefits apply.

Please write with full details, or contact me for an application form.

Manpower House, The Grove, Slough, Berkshire. Tel: Slough 73111 ext. 238.

MANPOWER

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Sales Engineer/Systems Engineer

£7K plus car plus commission

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Installing and programming small business systems

For further information please write or telephone Jenny Dalrymple-Hay on 01-493 2847 (office hours) or Beaconsfield (04948) 4579 (evenings and weekends) quoting reference no. CW9837.

WILLIAM KEY & PTNRS., 4 HALF MOON STREET, LONDON W1. (3818)

STRATHCLYDE REGIONAL COUNCIL

TECHNICAL SUPPORT OFFICER

(Female) (2 posts)
Salary Scale: APS/501 — £7077-£8865

Two Technical Support Officers are required for work on the specification, procurement, installation and maintenance of air air-line computer information system which will serve police forces throughout Scotland. The system, based in Glasgow, is expected to be in full operation in 1981. The Technical Support Officers will be based at Strathclyde but some travel, particularly in Scotland, will be required.

The successful applicant will be responsible for providing technical support to a team in a variety of activities.

Applicants should have appropriate experience of on-line information systems in one or more of the following disciplines: System Analysis and Design, Data Communications, Installation and Implementation.

A full job description together with an application form is available on request from the Assistant Director of Management Services (Strathclyde Sub-Region, Strathclyde House, 10, South Street, Glasgow, G1 1TA). In return, completed forms, quoting Ref. 82100, should be received by 4th December, 1980.

E. M. O'NEILL
Director of Management Services (3818)

FIELD SERVICE

LONDON, HOME COUNTIES, BRISTOL, SHEFFIELD, MANCHESTER, NOTTINGHAM, LIVERPOOL, LEEDS + BAR.

Salaries £ 6,175 - £ 8,600 (N.S.A.)

The above benefits are being offered by one of the world's largest growing divisional manufacturers. With an average of 2 new product launches each month our client is now seeking enthusiastic engineers to join their professional team and maintain this impressive growth record (80% p.a.).

If you are seeking a dynamic environment in which to develop your career, call now.

CONF. REF. 82110

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UNIVERSITY OF LIVERPOOL

DEPARTMENT OF COMPUTATIONAL & STATISTICAL SCIENCE

PROGRAMMER

To meet several projects on software tools for automatic documentation programs financed by the U.K.C. The appointment is for an initial period of 12 months, renewable for a further 12 months, as long as the project requires it. Applicants should have an honours degree or equivalent and a knowledge of FORTRAN and/or COBOL will be an advantage.

Salary in range £2900-£3245 (under revised starting salary according to qualifications and experience).

Application forms may be obtained from The Registrar, The University of Liverpool, 111, University Road, Liverpool L69 3GB. Completed forms to reach 101 500 by 10th December 1980.

SYSTEMS MANAGER

required by private hospital group for development and operational management of patient administration and accounting systems.

Salary within range of £9-11,000 p.a. Company car provided contributory pension scheme, free medical insurance.

Suitably qualified and experienced candidates are invited to apply in confidence to:

The Managing Director, Saltcham Clinics Ltd., 21 Stangle Gardens, Weymouth, Dorset. (3819)

New and Challenging Opportunities... ...For Marketing and Support People

The company is one of the largest and fastest growing manufacturers in the systems business. It already enjoys a tremendous reputation in the DP and WP field, and sees the future as the uniting of these current technologies together with telecommunications etc. into a fully integrated information system.

A new, powerful marketing team is to be formed to ensure this technical concept is a business success. The head office and field support teams are being extended to make an idea a reality.

The creation of the marketing team offers unrivalled opportunities for marketing, sales or sales support professionals to advance their careers. Similarly the extensions to the support organisation offer the right people the opportunity to develop still further and share in the company's success.

Product Marketing Specialists

£15,000-17,000 Pkge + Car

Reporting directly to the U.K. Marketing and Support Manager these are key positions, interfacing with the U.K. Sales Force and the U.S. Corporate Marketing Division, maximising market penetration and optimising product acceptability. Responsibilities will include U.K. product announcements and launches, supporting documentation, pricing policy, U.K. specific requirements etc. A specialist, probably in the age range 27-39 will be recruited with clear responsibilities in the following three product areas:-

- 1. Virtual Storage Computer Based Products**
These are technically advanced data processing products capable of supporting sophisticated communications networks, word processing, electronic mail etc. Candidates should have strong DP backgrounds, marketing, sales or sales support experience, hopefully exposure to IBM equipment and telecommunications, plus the personality and determination to succeed - by helping others succeed.
- 2. Word Processing Based Products**
Already a world leader in W.P. the company is pioneering the integration of W.P., D.P. Photo-typesetting, Telecommunications, etc. Again, applicants should have relevant technical backgrounds plus marketing or sales experience, with the right personal attributes for success in marketing.
- 3. Small Business Systems**
Here the emphasis is on the marriage of hardware and application software to solve today's defined business problems. Applicants should have marketing capabilities, a good understanding of business and applications packages and the market's requirements in this area. Experience in a software house could be an appropriate background.

Strategic Marketing Analyst

£10,000-15,000 Pkge + Car

Again, reporting to the U.K. Marketing and Support Manager, the incumbent will study the market, estimate its potential and the company share, identify and analyse the competition, advise on product pricing and contribute positively to the success of the company's products in the U.K. market. Applicants should have relevant market analysis skills, business awareness, the intellectual ability and judgment to make the right recommendations from incomplete data.

Virtual Computer Product Consultant

£10,000-13,000 + Car

A member of the Head Office Technical Support Team, this is a technical role, providing a centre of competence in the organisation for virtual machine products. You will work closely with the Field Support Team but also provide advice to the Product Marketing Specialist. Probably aged 23-36, applicants should have strong technical backgrounds, ideally including IBM DP and telecommunications products.

Branch Support Analyst

£10,000-12,000 + Car

Essentially post-sales support work, applicants will require in-depth knowledge of teleprocessing systems, particularly in conversation with IBM hardware and software. There will be a great deal of customer contact, previous experience with a manufacturer or consultancy would be advantageous, as would knowledge of word processing equipment.

Please telephone (24 hour answer service) or write. Quote Ref: CW 162-T

CAPP ASSOCIATES

01-686 9693

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AMP House, Dingwall Road, CROYDON CR9 9XA

Apply to 151A

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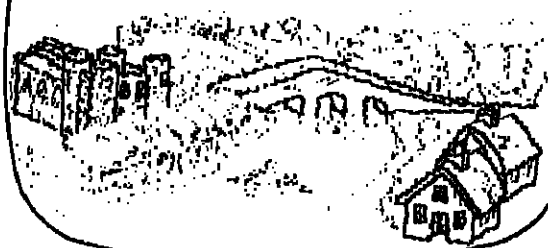


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Develop your future by helping us to project ours

£9,000-£11,500

CAD/CAM Analyst/Consultant
SOMERSET



We are a well established West Country Company with a deep commitment to the pursuance of new techniques to enable us to become more efficient and, therefore, more profitable in our business.

Our new CAD/CAM Design Studio will be equipped with an impressive array of computer and colour graphics hardware and will be an invaluable asset to our design and manufacturing ability. To ensure maximum effectiveness from the Studio, we plan to appoint an Analyst/Consultant to be responsible for the development of application programs and to advise on the profitable extension of the Studio and the technology.

We feel that the requirements of this position call for a degree in Maths or Applied Science, a good fluency in FORTRAN, and a demonstrable background in a Mathematics or CAD/CAM related post. Additionally, it will be essential to possess a personality and style of communication which will facilitate a successful man/machine interface. Any experience of NC Machines and/or finite element analysis would be advantageous.

We offer an excellent range of benefits to accompany the high basic salary on offer. These include annual bonus, non contributory pension scheme, regular salary reviews and a full relocation package to this delightful part of the West Country.

If you would like to find out more, contact our Advising Consultant,
MARTIN STAINTHORPE ON 021-236 3781 (24 hour answering service)
OR 021-744 1862 (7-9.00 p.m. evenings and weekends)
to arrange a confidential meeting.

London 01-835 0871 3 Mandaville Place, Wigmore Street, London W1M 5LB
Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA
Brussels 010 322-640 7161/71 Avenue Louise 327, Boite 4, 1050 Bruxelles

Specialist Computer Recruitment Ltd

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Contract or permanent, six months' assignment at our client developing comprehensive on-line systems. Experience of writing instructional and procedural documents and ability to communicate with staff at all levels is essential.

Contact: Bob Carr on 0727 34301 (24-hour Answerphone)
Fraser Williams (London) Ltd., 3a Canberra House
17-18 London Road, St Albans, Herts.
or contact Ian Gold on 01-585 0836

Fraser Williams
Computer Consultants

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The successful applicant will be an enthusiastic, experienced and well equipped computing team involved in the teaching of computing at all levels up to Part I Degree Computer Science Standard.
The College is active in the development of new and innovative computing facilities.
Salary Scale, Lecturer Grade 1 - £4,653 to £6,056 in 15 increments.
Successful applicant will be offered a competitive salary and a generous pension scheme.
Applications are now invited for the above post at convenience as well as possible, and forms and further details (including Post No 1) may be obtained from:
The Principal
Wentley College of Technology,
Cotton Lane, Wentley,
Wentley, West Midlands B96 3BN
Tel: 021-859 4121 Ext. 2. (15062)

ANALYST/PROGRAMMERS

London IBM Cobol/PLI/Mark IV
Tel: Roger Barnes on 01-838 4200
486 Cophall Avenue, EC2R 7DA
(1212)

YORKSHIRE REGIONAL HEALTH AUTHORITY

The Authority's Computer Centre situated in Harrogate provides a regional service to the seven Area Health Authorities in the Yorkshire region. The Centre operates an ICL 1904S computer running under the GEORGE 3 operating system and plans are in hand to install ICL 2900 equipment in the near future.

Applications are invited for the following posts:-

INTERMEDIATE SYSTEMS DESIGNER

(APPLICATIONS) (REF. 76)
STARTING SALARY £7134 RISING TO £8761
The Authority is seeking an experienced Computer Systems Designer to work on a variety of projects. Applicants should have a sound educational background together with 3 years or more practical design experience and a total of at least 5 years computing experience. Formal systems training would be preferred.

BASIC SYSTEMS DESIGNER

(APPLICATIONS) (REF. 77)
STARTING SALARY £6312 RISING TO £7694
This post although covering the same type of applications would be at a lower level and the requirements are for similarly educated people as above with 2 years design experience and not less than 3 years practical computing experience. Formal systems training would be preferred.

BASIC PROGRAMMER

(REF. 78)
STARTING SALARY £4834 RISING TO £6321
Applicants should have 1 year's practical experience in programming in COBOL, preferably also with plan and GEORGE 3 experience. Application forms and job descriptions are available from:
REGIONAL PERSONNEL OFFICER, YORKSHIRE REGIONAL HEALTH AUTHORITY, PARK PARADE, HARROGATE, NORTH YORKSHIRE
Please quote appropriate reference number. Closing date for all posts 10TH DECEMBER, 1980.

SOUTH WALES CONSTABULARY

Force Technical Computer Officer

£8,328 to £9,330
(Pay award pending)

The South Wales Constabulary are seeking an experienced computer professional to fill the new post of Force Technical Computer Officer at Police Headquarters, Bridgend.

The Force Technical Computer Officer will assume technical control of a computer based Command and Control system utilising a dual processor system supporting sixty Visual Display Units and forty printers, for which a contract is about to be awarded. He/she will be expected to liaise with police officers at all levels and give technical advice on problems arising with the operation of all the computer equipment associated with the South Wales Constabulary.

Applicants should have a relevant degree or professional qualification and considerable experience of the design and programming of dedicated real time systems using mini computer hardware.

The position is suitable for a person currently in a senior technical support position seeking wider managerial and technical responsibility.

Write or telephone for an application form to The Chief Constable, South Wales Constabulary, (Computer Post), Police Headquarters, Bridgend, CF31 3BN. Telephone 0656-55655 (extension 361/362).

Closing date for applications Monday, 24th November, 1980. (3618)

PROGRAMMERS

London IBM Cobol/PLI/Mark IV
Tel: Roger Barnes on 01-838 4200
486 Cophall Avenue, EC2R 7DA
(1212)

MODUS

Systems Software Consultants

Premium salaries, excellent career building opportunities.

Germany £17,000 to £23,000

This client has established a highly successful track record in the German marketplace, supplying consultants and project teams to a range of extremely significant software development projects.

The company has once again approached Modus, in view of our recent successful campaign on their behalf, to help recruit a further dozen software specialists between now and Jan/Feb 1981.

Candidates must have extensive exposure to one or more of the following areas:

- Large multi-processor IBM/UNIVAC/TANDEM sites.
- Designing and implementing dbms systems -- a good knowledge of the software is essential.
- Designing or amending such utilities as linkage editors, multi-access Interlacs etc.
- Supporting, enhancing or installing VM370.
- In-depth knowledge of channel software problems.

Appointees will initially be awarded 12 month contracts by our client, with the firm possibility of extensions of up to 2 years being offered on most projects. Additionally, permanent opportunities within the company may well be available on return to the U.K.

Customer Service Engineers

Tremendous opportunities with leading companies.

London & South c. £8,000 + Usual package

Modus has been inundated with requests by several major organisations to recruit experienced Customer and Field Service Engineers. The need to provide reliable and self-starting front line engineers has also been recognised by smaller and growing companies and some superb opportunities exist in this type of environment.

Primarily, we are seeking trained and experienced component level technicians who can be relied upon to diagnose and rapidly provide a solution to hardware problems. An ability to devise and use diagnostic software would be a bonus. Modus is keen to hear from any engineers who believe they can contribute to our client's needs and a full discussion is welcomed. Most requirements are in London, Home Counties and Southern locations.

Analysts and Analyst/Programmer

Total package dependent on experience and position.

North West London c. £10,750

A leading U.K. unit-linked life assurance company has planned significant investment in new systems development, incorporating the use of both on-line and database techniques for the next few years. To ensure the availability of up to date computing services within the company, a new IBM 4341 under DOS/VSE is being installed in the Spring of next year.

Candidates for Analyst/Programmer positions should have at least 4 years experience and, be fully fluent in PL/I and be able to take on a good deal of individual responsibility. Naturally, applicants for the Analyst posts will be expected to have had a thorough training in Systems Analysis and to be self-reliant and self-motivated.

Outstanding benefits include immediate mortgage subsidies and excellent career opportunities in a developing environment. Full job specification available on application.

Consultants:- Mike Creamer or Andy Wright

If the advertised positions do not match your experience or aspirations, Mike and Andy are always available for a confidential discussion of the possibilities. An informal meeting -- often an essential part of the process -- can be quickly arranged.

International Personnel Consultants

Modus Management Services Limited
148 Watling Street, Radlett, Herts. WD7 7JH

Telephone: Radlett (09276) 3077

Senior CICS Designer

To join one of the leading Systems Consultancies in the U.K.

Berkshire £9,000 to £11,000

This position would ideally suit a well qualified professional with upwards of 5 years in the industry, most of which will have been spent in IBM installations, where CICS has been extensively used. A thorough understanding of all the problems associated with developing and designing CICS based systems -- it possible to the software level -- is absolutely essential.

The company is an extremely well known and much respected software and systems house, well organised managerially, with career opportunities leading either to extremely senior technical or projects management positions and is absolutely committed to growth and expansion.

Naturally, company benefits are in line with the organisation's professional status and reputation in the industry.

Technical Authors

Hardware or Software documentation projects -- high technical content.

Holland-Norway-U.K. £7,000 to £17,000

Modus have a range of interesting and attractive opportunities for experienced Technical Authors, or computer technicians who are keen to enter this growing and absorbing profession of technical communication. We are always willing to fully discuss, in depth, the concepts and career prospects within this area of d.p.

The vacancies currently on our books require specialisation in hardware (communications, logic, electronic) or software (systems software, comms, protocols, languages, etc). The salary range reflects experience and location and these factors can be discussed on application, together with and various methods of employment.

Cobol Programmers

Development of applications systems in a career orientated environment.

Hampshire c. £6,000 + £1,500 benefits

We seek good COBOL Programmers with at least two years experience on any proprietary machine, either batch or real-time. Preference will be given to a background of commercial or financial applications.

Candidates must be prepared to commit themselves to a professional d.p. environment where the highest standards are expected. In return the company offers an outstanding career opportunity and the chance to utilise creative ability. A very generous relocation package is offered. Modus will respond quickly to all applications and interviews will be held in London.

Systems Analysts

Commercial and Financial systems design.

Hampshire up to £9,000 + c. £1,500 benefits

The company is committed to growth over the next five years with new systems to be designed in several areas. Preference will be given to Analysts with experience of insurance or financial systems, but the diversity of applications provides openings for Analysts with a wide variety of experience. The ideal candidates will be those seeking a challenging and highly professional d.p. environment where career progression is taken very seriously.

Initial interviews will be held in London by Modus as soon as possible after application and a speedy reaction is guaranteed. The company offers a generous relocation package.

GROUND FLOOR OPPORTUNITY IN RPG 2 PROGRAMMING

— SLOUGH
UP TO £6750 + BONUS SCHEME

Manpower is a large International organisation with 80 UK offices. We undertake contracts for clients in every section of industry and commerce covering all types of work including office, industrial and skilled.

Recent years have seen our business expand rapidly, and to assist in managing this growth, an IBM System 34 has been installed. Our first major application is nearing completion and a range of business systems is under review for urgent computerisation.

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Write with full details, or contact me for an application form.
Hannah Sutton, Personnel Officer, Manpower Limited, National Westminster House, The Grove, Slough, Berkshire. Tel: Slough 73111 ext. 238.



MANPOWER

SHEFFIELD/LEEDS ★ PROGRAMMERS ★ ★ SENIOR PROGRAMMERS ★ ★ ANALYST PROGRAMMERS ★

Fraser Williams further development requires permanent professional staff for clients' project work on site and maintenance. Good salaries linked to profit making. Car expenses.

Leeds: Ian Smith, 12 Park Place, Leeds. Tel: 0532 448927
Sheffield: Ian Smith, 12 Park Place, Sheffield. Tel: 0474 28638

Fraser Williams
Computer Consultants

UNIVERSITY OF LIVERPOOL COMPUTATIONAL & STATISTICAL SCIENCE PROGRAMMER

To assist research project on software tools for automatic data analysis, the University of Liverpool is seeking a programmer to work on the S.R.C. The appointment is for an initial period of two years starting in early 1981. Applicants should have an honours degree or equivalent and a knowledge of FORTRAN and/or COBOL. We are an equal opportunity employer. Salary in the range £5,000 to £6,000 per annum. Applications should be sent to: The Registrar, The University, P.O. Box 147, Liverpool L69 3BX. Completed forms may be obtained by 12th December, 1980. Supply Ref: HV627/CW. (1516)

RPG II PROGRAMMER

Applicants with knowledge of ICL software are preferred for this progressive company.
The General Manager, H & V Welfare Ltd, 10 King Street, Farnley, Gillingham CA11 7AJ. Tel: 0758 44771. (1537)

Apply to 153A



POLYTECHNIC

The Hong Kong Polytechnic is a large institution of advanced education which offers courses in a wide range of subjects. In addition to three major academic Divisions comprising 118 teaching departments, it also has a number of interdisciplinary institutes and centres. For the academic triennium 1981-84, emphasis will be placed on developing high level programmes and applied research activities relevant to the needs of Hong Kong. It is also envisaged that a number of vocationally orientated degree programmes will be introduced in this triennium.

The Polytechnic invites applications for the following posts which are tenable from September, 1981.

DEPARTMENT OF COMPUTING STUDIES

**Principal Lecturers/
Senior Lecturers/
Lecturers**

To teach Design of Real-time Systems, Computer Aided Design & Graphics, Systems Programming, Installation Management, Management Information Systems, Systems Analysis and Design, Applications Programming, Computer Systems, Data Base Management, Computer Applications in areas relevant to the Polytechnic including Engineering, Mathematics, Accountancy, Business Studies, Textiles, Applied Science and Design.

QUALIFICATIONS FOR APPOINTMENT AND SALARIES

Principal Lecturer:
HK\$128,600.
HK\$182,760 p.a.

Candidates should have (a) a degree or professional qualification and an advanced specialist qualification or extensive experience in a specialised field; (b) substantial professional experience; and (c) proven administrative ability.

Senior Lecturer:
HK\$107,580.
HK\$153,960 p.a.

Candidates should have (a) a degree or professional qualification and preferably an advanced specialist qualification; (b) substantial professional experience; and (c) proven administrative ability.

Lecturer:
HK\$81,380.
HK\$102,180 p.a.

Candidates should have a degree or professional qualification or in some areas, at least a Higher Technician qualification; and (b) at least three years professional experience.

Note: £1 = HK\$12.2 on 10th November, 1980.

CONDITIONS OF SERVICE

Appointment will be on two-year gratuity-bearing contract terms initially. Thereafter suitable appointments may be offered further contracts or supernumerary terms of service at the discretion of the Polytechnic. Benefits include long leave; subsidised accommodation for the overseas appointees; and local appointees on a salary of HK\$8,515 p.m. or above; medical and dental benefits; children's education allowance and a terminal gratuity of 25% of basic salary received over entire contract period.

Application forms and further information are obtainable from the Hong Kong Government Office, 6 Grafton Street, London W1X 3LB, U.K. Completed application forms should be returned to the same office by 8th December, 1980.

(3579)

New Career Horizons and Hampshire..... in one move



BOCM Silcock is a Unilever Company and a market leader in the manufacture of sophisticated farm animal feeds throughout the UK.

We wish to strengthen our development and maintenance team to support a major programme of existing applications and new developments. As part of the total company DP plan, development of several large applications for factory operational activities

— including order processing and factory planning — is due to commence shortly.

Our policy of distributed processing is supported by a wide range of hardware with appropriate communication links: ITEL AS/5 mainframe, 3 PDP 11/34's, 20 Datapoint minis plus microcomputer equipment.

Project Leader — c. £8000 — £11,600

This new appointment, reporting to the Computer Development Manager, involves active participation in development projects at all stages from feasibility study to implementation including systems analysis and design, project planning and project leading.

You should be a DP professional with a sound background in commercial computing including team leading. Experience of microcomputer systems an advantage.

Systems Analyst/Programmers, Systems and Support Programmers — Salary Range £6000 — £8000

Activities include system and program specification, program design, writing, testing, implementation and support; assisting in user training and liaison with project and user management.

You should have at least two years' experience of commercial programming. Knowledge of COBOL or PL/1, IBM OS JCL and/or minicomputer applications an advantage.

For all appointments, employment terms and prospects of advancement are excellent with generous re-location assistance available if appropriate. The positions are based in Basingstoke which is within easy reach of London yet has the advantages of a rural location and good access to the South Coast and New Forest. Candidates, male or female, interested in joining us should indicate their initial job preference and send brief but comprehensive personal and career details (including salary) to:

BOCM SILCOCK



Alan Coates,
Staff Personnel Manager,
BOCM SILCOCK LTD.,
Basing View, Basingstoke, Hants.
Tel: Basingstoke 29211, ext. 378.

(3600)

SENIOR SYSTEMS ANALYST

An experienced data processing professional is required by this production division, which is part of the Sterling-Winthrop Organisation based near Sheffield, engaged in the manufacture of d.i.y. industrial and domestic hygiene products.

Using an IBM System 34 we are currently engaged on computer projects which require new operating and system philosophies being generated and have new projects coming on stream. Thus it has been decided to create this position within our small data processing department.

The person appointed will report to the Data Processing Manager and deputise for him as required. He or she will be expected to make an early effective contribution and will therefore have experience of IBM G.S.D. equipment ideally in a manufacturing environment. The job will involve the development and implementation of important new projects including a major extension and development of an I.P.N.C.S. package involving provision of on-line screens plus the implementation of other production related systems.

This is a senior staff position offering an attractive salary and terms of employment commensurate with those expected from a large organisation.

Please write or ring (Sheffield 487777, Ext. 118) for an application form to Roy Gantworth, Personnel Manager.

STERLING PRODUCTION DIVISION
Chapelton
Sheffield S30 4YP

Sterling Production Division

(A member of the Sterling-Winthrop Group)

Thames Polytechnic

Computing Services Centre Computer Applications Adviser

The Computing Services Centre, part of the School of Architecture and Landscaping, is seeking an experienced and enthusiastic person for a post of Computer Applications Adviser. The applicant should preferably be an architect with knowledge in computer science and experience of teaching applications of computing to architecture students; expertise in computer programming for the architecture and application of computer graphics to architecture will also be considered. The post is temporary for one year with the possibility of extension.

Salary: £22,000-£24,000 p.a.

Further particulars and application forms from the Staff Office, Thames Polytechnic, Watlington Street, London SE18 6PP, can be obtained by 8 December 1980.

UMIST CONTROL SYSTEMS CENTRE RESEARCH ASSISTANT

REF: CSC/218/KC. Applications are invited for the above post to work on the development of new software techniques for the control of industrial systems. A knowledge of control systems design methods would be valuable but not essential. The successful candidate will be responsible for the design, development and testing of software for a high speed digital computer. Salary will be in the range £7,000-£8,000 per annum. Requests for application forms and further particulars, quoting the above reference, should be addressed to the Registrar, Room 88, UMIST, PO Box 16, Manchester M60 1UD. The closing date is 9 December, 1980. (3634)

SYSTEM 34 RPG II

Contract Programmers
urgently required for London
assignment.

TEL. 01-606 4738

BUSINESS SYSTEMS EXECUTIVE

c. £12,000 West Yorks.

Our client is an affiliate of an international company with major UK interests in chemicals and pharmaceuticals. They recognise the importance to their business of integrated management information with effective data processing support and they now wish further to develop and improve their information systems. Accordingly they seek to recruit an executive who can:

- diagnose user requirements
 - propose present facilities and services
 - introduce new information concepts
- Emphasis is directed towards creative thought with realism, an understanding of business needs and a strong identification with achievement. Success will make a significant impact in a rewarding environment and places will lead to promotion.

The successful candidate is likely to be between 32 and 40 years, graduate and/or professionally qualified with a background in systems consultancy, management services, O & M. Location is West Yorkshire within easy reach of desirable residential areas. Some UK travel will be necessary with occasional visits to European offices. The salary indicator is £11,000-£13,000 per annum and the attractive package of fringe benefits includes company car and re-location assistance. Please write giving full details of your career and salary progression and listing any companies for whom you do not wish your application to be considered to:

G.N. Lapsley, Partner,
NCP Management Consultants,
Royal Liver Building,
Liverpool, L3 1JH.

(3608)

Dear Programmers and Senior Programmers,

Marcol is one of the leading European Software houses.

The projects we work on are the envy of the competition whether in the U.K. or Europe. Commercial systems development, transition and conversion projects, satellite communications, hotel management, insurance and banking are just a few of the areas we are engaged in.

We are looking for people with a minimum of 2½ years DP experience to work with us — not for us. To prove that point, you become a shareholder in the company after just two years — everyone does.

If you are interested in a competitive salary, with an opportunity to travel, promotion, a permanent and progressive career, call me now. I'm looking forward to talking with you.

Yours sincerely,

Penny Bailey

Penny Bailey

20th November 1980

60 Queen's Gardens
London W2 3AF
Telephone: 01-402 9355
Telex: 28801

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HOLLAND & UK VIA I.A.

Industrial Artists has more challenging and rewarding positions on offer, both on its own staff AND ALSO on the permanent staff of its many clients. A selection from the most urgent of these comprises:

FOR HOLLAND, within the I.A. team but, based on the client's premises:
4300 SERIES COBOL PROGRAMMER with at least 3 years experience for a DMSISE environment using DL1 - applicants having 158/168 experience will be seriously considered.

VIA 370 COBOL PROGRAMMER with at least 3 years experience, for an OS environment. Knowledge of CAMSIS/SDMS & VSAM would be of distinct advantage and, any systems programming experience would be useful.

YOUNG TECHNICIANS (aged 20 to 25) having a good electronics background preferably in Design (or close equivalent) standard, to TRAIN AS INSTRUCTORS over 1 to 2 years with a manufacturer of mini-computers. Previous computer knowledge and/or experience is not sought in total but, that of DIGITAL TECHNIQUES and some of the BASIC language will be looked for.

TECHNICAL AUTHORS possessing at least 3 years experience of HARDWARE ASPECTS OF PRIVATE TELEPHONE EXCHANGES. Must understand digital techniques and micro-processor applications. Knowledge of dedicated systems & processing principles is desirable. Coverage of manuals to be written is software oriented both for total and sub-systems and their installation, maintenance and servicing - and for a new equipment for 50/800 subscribers.

3031 (or 158/168) PL1 PROGRAMMERS having at least 3 years experience, including IMS and/or TSO, for an OS(MVS) environment and, preferably, with knowledge of SOCIAL INSURANCE and/or TIME REGISTRATION applications.

HONEYWELL BULL L64 & L66 ANALYSTS & PROGRAMMERS with a sound knowledge of COBOL, DM4 & IDS/TS.

SYSTEMS PROGRAMMER with a first-class Assembler background and, preferably, a knowledge of SIEMENS B52000 and CSAM for an immediate (or close to) start.

For the above positions excellent salaries are on offer, including generous concessions negotiated with the Dutch taxation authority, four weeks paid holiday per annum, paid national holidays and certified sick time, a holiday bonus plus the full support of the administrative staff based in our Dutch offices.

MANAGER for SYSTEM DEVELOPMENT DEPARTMENT. Will hold responsibility jointly for total policy and completely for supervision of circa 175 staff engaged in development and maintenance of applications programs. Must be a proven manager who, although not a specialist, nevertheless has a reasonable degree of computer knowledge and experience. An academic or equivalent education is looked for and ability to either speak Dutch, or learn quickly, is mandatory. Basic salary package negotiable to Guider equivalent of £21,000. Here location is Utrecht - and is a "client permanent staff" position.

IN UK and for our clients' permanent staff:
1 DEC PDP 11/40 PROGRAMMER with minimum 1 year using BASIC+ Location: Bournemouth Salary: £8000

2 SYSTEMS PROGRAMMER with minimum 2 years Assembler. Salary: £9000
SYSTEMS ANALYST having 5 years experience and previous ± 2 years in programming is also held. Knowledge of Life Assurance application will be preferred. Salary: £7800
SENIOR OPERATOR with 23 years experience, plus the ability to write JCL. Salary: £5600

Positions are for a 3031 environment under OS/VS1 with CICS. Relocation allowances also available, plus subsidised mortgage facilities. Location: Bournemouth

3 SYSTEMS ANALYST/PROGRAMMER for a SYSTEM 34 environment, with minimum two years RPL 11. Installation is new and the system has to be set up. Possibility of promotion to DP Manager within nine months. Travel to overseas locations may occur. Location: Malmesbury Salary: £9500 plus bonus.

4 TWO PROGRAMMING TEAM LEADERS with minimum 4 years experience. First required for 1903 PLAN-COBOL conversion and second for systems development. Salary: between £7,500/8000 with January review. **SENIOR PROGRAMMER** with 24 years experience. Salary: £5500 with June review.

PROGRAMMER with 1/2 years experience. Salary: £5700
Hardware: 2980 under VME/B and COBOL. Some Fortran knowledge would be advantageous.
40 hour week with 8.15am start. Relocation costs available to householders. Location: Southampton

SENIOR SYSTEM ANALYST with minimum 4 years experience, preferably in manufacturing environment. Salary: up to £9,500
SENIOR PROGRAMMER with minimum 3 years COBOL plus good TP. Salary: up to £7,700
Hardware: ICL 2980 under VME/B and DME + minicomputers. Location: Basingstoke. Relocation allowance possibilities.

6 TWO SYSTEMS ANALYSTS - first with project control, DB/TP experience and professional qualifications. Second with expertise to help sell the time-sharing service. Salaries between £9,000/9500 Relocation allowance possibilities. Hardware: Honeywell L66 - with training if required. No programming involved. Location: Winchester

7 TWO SYSTEMS PROGRAMMERS with minimum 3 years experience. In one case, IBM background required, but Univac training will be given. Salary: £9000 max. Salary range: £7500/8000
Hardware: Univac 1100/62 with OS 1100 & TP
Location: Galloway area

8 SOFTWARE AUTHOR with minimum 2 years writing, for commercial business applications (office automation) work. Software engineering background covering either Operating Systems, Compilers, Communications, Business or Laboratory applications is essential. A Programmer, Analyst or Instructor having a proven command of written English could be considered. Location: Reading - Salary: £8000 upwards.

SO PLEASE WRITE OR TELEPHONE NOW:

Ann Arlidge
Marketing and Recruitment Director,
Industrial Artists Limited
21 Bamford, Hiltin,
Herts SG5 1JW.
Tel: (0452) 627412/3 or (0438) 727522 (Eve/Weekends)
It is a registered Employment Business licensed by O & E.

21

CUT IT OUT CONTRACTORS

NAME _____
ADDRESS _____
TEL HOME _____
DATE AVAILABLE _____
SOFTWARE LANGUAGES USED _____
HARDWARE _____
TECHNICAL SERVICES USED _____
DIRECT PROGRAMMING SERVICES LTD., "FREEPOST", 51 LONG LANE,
WEST SMITHFIELD, LONDON EC2E 1DP. Alternatively: Tel. 01-606 1738 (24-hour Service)

IBM Operators

What's stopping you from answering this advertisement?

Is it our famous name? While we fully understand that some people enjoy obscurity, it's our experience that most would enjoy the prestige of working with Thomas Cook. We're the world's most famous name in travel - and we're big in banking too.

Is it our advanced equipment? The kind of person we're looking for should be eager to get to grips with our 2 brand new IBM 4341's running under DOS/POWER/VS1 not to mention our T1990 and DEC PDP/11 minis.

Is it our man/woman specification? Obviously there aren't too many people of the calibre we're looking for, with at least 3 years operating experience, a working knowledge of JCL and a keen awareness of D.P. trends.

Is it the potential of the job? We have excellent career opportunities within the Management Services Division for those prepared to take advantage of them.

Is it the pay and conditions? £6,500 p.a. (including shift allowance) may not put you in the superlatix bracket, but its pretty competitive, and there's a long list of benefits to back it up - including profit share, low interest loans, paid overtime, holiday concessions and sports/social facilities.

Is it our location? Be assured that Peterborough is a very pleasant place to live with inexpensive housing and a regional shopping centre development. Our purpose built centre at Thorpe Wood is a model for the best working conditions of the future.

Interested? Then contact John Honour, Personnel Manager, The Thomas Cook Group Ltd., P.O. Box 38, Peterborough, PE3 6SB. Tel: 0733-502148.

Thomas Cook

CONTRACTS

£320-£400 PER WEEK
LONDON & HOME COUNTRIES

ICL 2900 VME/B, IMS COBOL FORTRAN
UNIVAC 1108 RSX 11/M COBOL/MACRO
DEC PDP11 AMIS
IBM AS/400
HONEYWELL L66 TOS, IDS COBOL JACKSON
COBOL

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£6,000-£14,000 P.A.
Over 100 positions for all levels of computer staff. Commercial and scientific applications.

Please telephone:
SONIA, GILL OR PAUL, ON 0258-32023
or write to:
SYCOM

COMPUTER SYSTEMS ENGINEERS LTD.
Market House, Market Square, Aylesbury, Bucks.

COMPUTER OPERATOR

No Shifts
Salary £4,500

Based in rural Godalming.

Operator with previous knowledge of DISC BASE Computer Systems, required for two NCR 1/8250s running under IMOS 1 and using IOCS. Applicants should possess the ability to work to strict deadlines.

For an application form telephone or write to:

Mr. C. Slade, Computer Manager
Bookwise Services Ltd.
Langham Trading Estate
Cotteshall Lane
Godalming, Surrey
Telephone: 04888 4152 ext 287

CROYDON COLLEGE

Fairfield, Croydon CR9 1DX

Applications are invited from suitably qualified persons for the following post, duties to commence on 1st February, 1981.

COMPUTER STUDIES SECTION

LECTURER I COMPUTER ROOM SUPERVISOR/ DEMONSTRATOR

Computer Room Supervisor/Demonstrator required to run the day-to-day operation of the DEC PDP 11 computer system and to provide software and teaching support. This post is for a graduate interested in both hardware and software, providing a technical service to students and staff. This is a new installation and the successful applicant will be expected to take part in the definition and implementation of operational procedures.

The salary for the above post is in accordance with the current Burslem Further Education Award, and is at present:

LECTURER I £6,105-£8,583

which includes the London Area Allowance. Additions to the scale may be made for appropriate qualifications and the point of entry is dependent on previous relevant experience.

Further details and application form may be obtained from the Vice-Principal, to whom completed forms should be returned.

Software and Electronics Engineers

Exciting Opportunities in a high technology environment

We are a leading company at the front end of technology in the design and development of large OEM-based user systems involving PDP 11 and micro-processors. Product technology in our field of graphics colour image processing is fast developing and so we place great value on the technical ability and creativity of our software and electronics design staff.

To strengthen our existing resources and looking to the future, we'd like to talk to people whose combination of experience and job interest matches that outlined below. There are opportunities at a variety of levels and rewards are commensurate with the challenge and stimulus offered.

Software Engineers

- Areas of Activity**
- design and development of total software packages
 - specifying systems design
 - writing programmes for real time operation modules using RT11, RSX11 and MDOS operating systems
- Areas of experience**
- software design for real time operating systems
 - PDP 11 macro assembly language
 - industrial applications analysis and design
 - Motorola 6800/6809 Assembler
 - electronic hardware

Electronics Engineers

- Areas of activity**
- detailed design of TTL and micro-processor electronics related to disc-controller interface
 - detailed digital and analogue circuit design including prototype commissioning
 - state of the art devices
- Areas of experience**
- logic design in relation to computer peripherals
 - analogue design for phased locked loops, high voltage amplifiers and noise reduction
 - proven design capability for medium sized production products

We offer a challenging technical environment; freedom in work operation; project control experience and a competitive salary and benefits package.

Interested to find out more? Please telephone or write for an application form to P. L. Jay, Crosfield Electronics Limited, 786 Holloway Road, London N19 3JG. Tel: 01-272 7766, ext. 3346.



Crosfield Electronics

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A De La Rue Company (3624)

DIGICO ASSEMBLER

PROGRAMMER

Contract or permanent for early start. 3-month assignment with our North London client, developing process control oriented applications.

Contact: Ian Gold on 01-388 0036
FRASER WILLIAMS (London) LTD.
38 Warren Street, London, W.1

Fraser Williams
Computer Consultants
LONDON ST ALBANS LIVERPOOL LEEDS MANCHESTER NOTTINGHAM BRISTOL SHEFFIELD GLASGOW TORQUAY NEWCASTLE (2803)

UNIVERSITY OF SOUTHAMPTON

NUMERICAL ANALYST

Applications are invited for the post of Numerical Analyst within the University's Computing Service. The successful applicant will give a supporting advisory service to computer users in the field of engineering and applied sciences, and in the techniques of mathematical model building.

The University has access to a very powerful computing facilities and a wide range of different machine architectures. The applicant will be expected to give advice on the suitability of different numerical methods for various computer systems available. He/she will be especially concerned with a support of new machine architectures such as vector and array processors.

Applicants should normally possess a postgraduate qualification in numerical methods or a first degree with a major content of numerical analysis. Experience in the application of numerical techniques to practical problems is highly desirable.

Salary will be within Range 18/19A £785-£835 p.a. Starting point, according to qualifications and experience.

Applications (two copies) giving date of birth, curriculum vitae and the names and addresses of two referees should be sent to Mrs P. Vaughan-Smith, Staffing Department, The University, Southampton SO8 9BH, from whom further details can be obtained. Please quote ref. 1170/A/24. (3623)

COBOL PROGRAMMER/ANALYST

Experience person required for Software Engineering in ICL ME28/2900 systems, with varied applications and on interesting project. Negotiable for right person.

Tel. 0982 33208 or write to:
T.I.P.S. Ltd.
2088 High Street
Waltham Cross
Herts. (3631)

YOUNG SCHOOL LEAVER

Interested/familiar with Home and Micro Computers. Prof. LONDON area. Tel. 784-8864 (3677)

BOX Nos.

Box number replies should be addressed to:
Box No. 6/6 Computer Weekly
Derby House,
Stanford Street
London SE1 9LU

LECTURER I in COMPUTING

The successful applicant will be an enthusiastic go-ahead graduate or other suitably qualified person, able to augment a well established and well equipped computing team involved in the teaching of computing at all levels up to Part I. The College is active in the microelectronics field and offers the opportunity for development in this area.

Salary Scale: Lecturer Grade 1 - £4,683 to £8,085 in 16 increments.

Successful applicant is an equal opportunity employer and vacancies open to both sexes. All first, and to registered disabled people.

Applicants are now invited for the above post to be interviewed as soon as possible, and some further details (including Post No.) may be obtained from:

The Principal
Widley College of Technology
Cromwell Lane, Stratford-upon-Avon, Warwickshire CV37 9JF
Tel: 0592-658 4121 Ext. 3. (3603)

BOURNEMOUTH COLLEGE OF FURTHER EDUCATION

SENIOR LECTURER:

Head of Computing/Microprocessor Unit

This new post has been created to further the development of an existing section of the College. Present provision includes a large commitment to NCE, Theoretical Courses. A candidate is sought who has the will and the capacity to lead the unit, to provide a service to the College and the community. Appropriate qualifications and experience in the use of Computer Science and teaching are required as essential.

Application forms and further details available from the Principal.

Severn-Trent Water Authority

Business Systems Analysts

Starting Salary c£8,000 p.a.

Severn-Trent's Data Processing Department is not only unlikely to experience any reduced demand for its services but also, like most big organisations, has years of growth and development in store.

Much has been achieved in the establishment of our computing facilities and operational systems. Additional people are still needed to cope with these new demands. The successful candidates will initially be assigned to a large project team dealing with all income systems. The changing and service policies require that these systems are developed to the level of an integrated customer services facility in due course. About three years of development by this team is virtually assured.

Some 55 people in total are assigned to our central development unit dealing with an extensive list of financial, operational, scientific and engineering systems. Career prospects are excellent for those with the ability and enthusiasm to ensure the success of their individual assignments.

The posts are based at Regional Headquarters on the eastern outskirts of Birmingham and carry an attractive benefit package which includes incremental salaries, a minimum of 35 days annual leave (including public and other holidays), first class pensions/sick pay schemes and flexible working hours. We also believe that these opportunities can offer a unique combination of security and personal fulfilment.

Application forms, quoting reference C 220, and further details are available from the Regional Personnel Manager, Severn-Trent Water Authority, Abchurch House, 2297 Coventry Road, Sheldon, Birmingham B26 3PU. Telephone 021 743 4222.

The posts are open to both men and women.

ANALYST/PROGRAMMERS

London IBM Cobol/PL1/Mark IV

Tel: Roger Barnes on 01-688 4200
886 Cophall Avenue, EC2R 7DA
Tel: 01-688 4121 Ext. 3. (3603)

THE SALES BIT

Finding a job gets harder as you go higher

THIS was the first year at Compuc for Sales and Marketing Services, and with three days available rather than my customary day-trip, I was presented with a much greater opportunity for meeting long-established friends and business acquaintances from all parts of the computer industry.

It really was most enjoyable. We even got some business out of it.

One of the people I met was a man who had come to me for a management job some three years ago. He was already an experienced sales manager at that time and wanted a similar role with some other company. Unfortunately, and as is usually the case, there were no suitable opportunities available.

However, he was under some pressure to move at the time, so I suggested he took a senior sales job within what was likely to be an expanding situation. This would provide real opportunities for an early return to management depending on the success of both the total operation and himself.

Demand

There is an identifiable line in a sales career up to which the chances for further employment increase, and beyond which they rapidly decline. From the sales trainee to the senior salesman, there is an increasing demand for one's services as one's selling skill and experience increase and the number of available jobs increases or at worst remains static. The computer industry is probably short of over 1,000 competent salesmen.

Whereas the first hint of the title "manager" produces a significant drop in demand, even if the job involves only the management of oneself, as in the case of account managers. Thereafter there is an exponential decrease in demand for one's services up to the level of Ruler of the Universe.

High earnings

I am pleased to report that he now manages a successful operation of some 12 people, all recruited by himself working within a business he built up by his own efforts. His earnings are high and he is enjoying his job. As you might imagine, he is very pleased he made the move, even though he was a little apprehensive about the risks at the time.

This conversation led me to thinking about the many other managers I meet during the course of a year who are considering a change of job or have had a change of employment thrust upon them.

Murphy's Law states "there are always plenty of job opportunities at management level until you want one".

The reality is a function of the hierarchical pyramid created by the typical management structure. The higher up you go, the narrower it gets. The most difficult person to re-employ is a managing director who wishes to do the same job somewhere else.

Gossip

In this kind of situation confidentiality is paramount. The sales manager who is on the job market is at much greater risk than a salesman. While there is the problem of few if any relevant jobs being immediately available, there is also the hazard of becoming the victim of the industry grapevine.

A manager thinking of a job change is interesting gossip and the more senior the person, the more news he becomes.

"Might be interested if the right opportunity came along" can soon develop into "decided to leave".

It is, therefore, essential that a manager limit such confidentiality to people he knows and trusts, or at the very least individuals highly recommended by someone whose judgement he respects. He should deal harshly with anyone who betrays his confidence.

Development planning

THE British Computer Society's Developing Countries Specialist Group will hold its first international symposium on the theme "Computers in Development Planning". It will be held at the Institute of Education in London, from March 23-27, 1981. Delegates who register for the symposium before January 20 1981 may do so at reduced rates of £270 for BCS members, £315 for non-members and £300 for members, £350 for non-members and £200 for BCS students. The symposium will concentrate on four main areas: Communications and Transport, Agriculture, Water Resources and Finance. Further details from BCS, tel: (01) 637 0471.

TRADER

Puzzle Answer

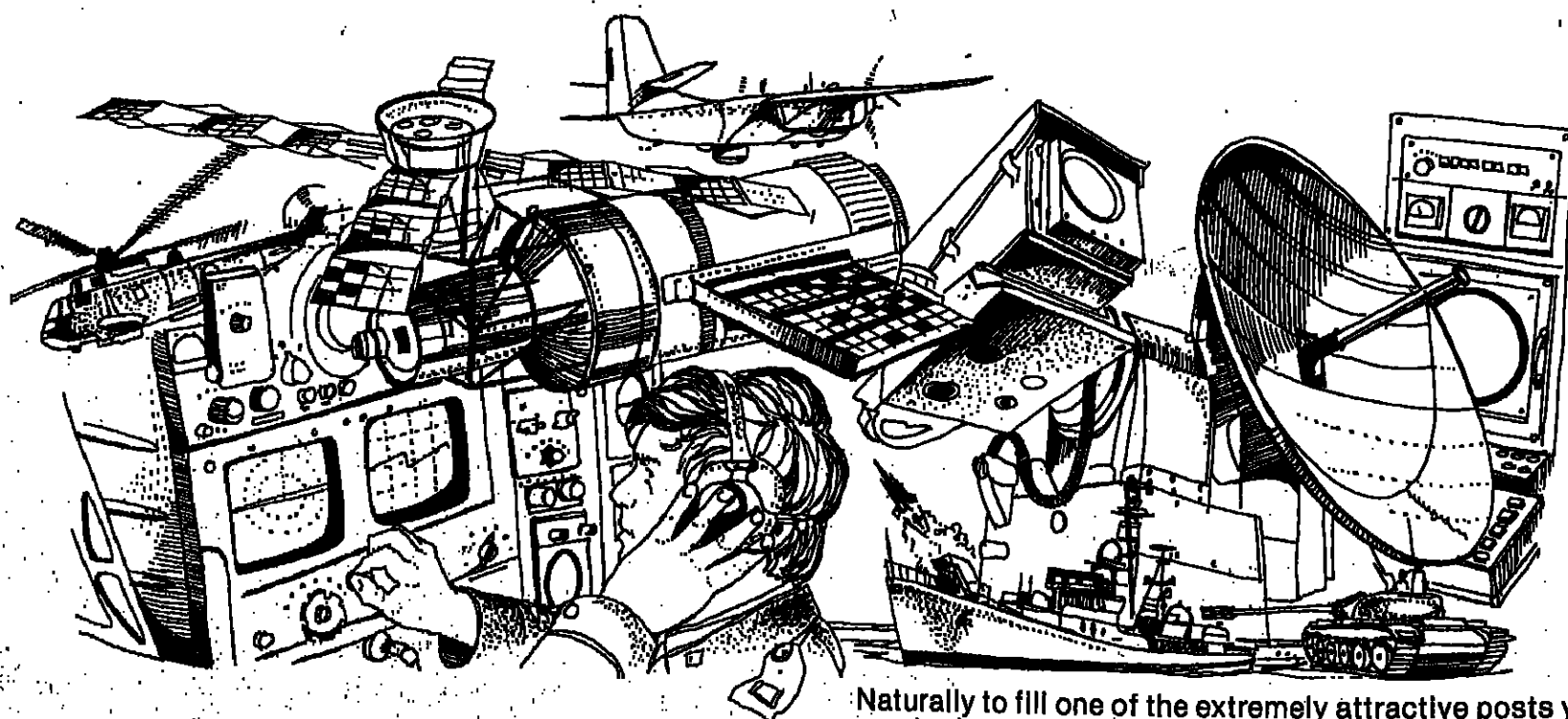
IF a square is inscribed in the first circle, a smaller circle inscribed in the square will be half the area of the original one.

REAL TIME SOFTWARE DESIGNERS

Salary to £12K plus car allowance

LONDON / HOME COUNTIES

Our Clients are the U.K. subsidiary of a well established American systems house operating in the scientific field with a considerable reputation for its technical excellence. Not only have they already opened two major offices close to London but a third is planned for early next year with the intention of establishing centres throughout the U.K. at a later stage.



What is certain to attract you is their well established customer base in the following fields:

MILITARY SYSTEMS
AVIONICS
ATE
PROCESS CONTROL
OPERATING SYSTEMS
COMMUNICATIONS

Naturally to fill one of the extremely attractive posts you will be required to have an excellent educational and technical background with good experience in real time systems and assembler programming.

In particular our clients value:
*Familiarity with such mini-computer systems as DEC, GEC, SEL, DG, HP or GA.
*Firm knowledge of high-level technical scientific language e.g., CORAL, PASCAL, FORTRAN or RTL.
*Experience in micro-computer systems.
We are looking for high-grade staff and the financial rewards are excellent as is the demonstrable career progression. This could be your chance to join a dynamic team of first class professionals who are committed to building up a wide range of professional services. Remuneration, depending upon experience, will naturally be enhanced by the normal benefits expected with an established organisation. Where travelling is required a generous car allowance will be paid.
For further information or to arrange an interview please contact ROY HIGHFIELD quoting reference CW2011.

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP

TELEPHONE: 01-353 7141 (24 HOURS)

Hutton

SPECIALIST RECRUITMENT CONSULTANTS

YORKSHIRE REGIONAL HEALTH AUTHORITY

The Authority's Computer Centre situated in Harrogate provides a regional service to the seven Area Health Authorities in the Yorkshire region. The Centre operates an ICL 1904S computer running under the GEORGE 3 operating system and plans are in hand to install ICL 2900 equipment in the near future.

Applications are invited for the following posts:—

INTERMEDIATE SYSTEMS DESIGNER

(APPLICATIONS) (REF. 76)

STARTING SALARY £7134 RISING TO £8761

The Authority is seeking an experienced Computer Systems Designer to work on a variety of projects.

Applicants should have a sound educational background together with 3 years or more practical design experience and a total of at least 5 years computing experience. Formal systems training would be preferred.

BASIC SYSTEMS DESIGNER

(APPLICATIONS) (REF. 77)

STARTING SALARY £6312 RISING TO £7684

This post although covering the same type of applications would be at a lower level and the requirements are for similarly educated people as above with 2 years design experience and not less than 3 years practical computing experience. Formal systems training would be preferred.

BASIC PROGRAMMER

(REF. 78)

STARTING SALARY £4834 RISING TO £6321

Applicants should have 1 year's practical experience in programming in COBOL, preferably also with plan and GEORGE 3 experience.

Application forms and job descriptions are available from:
REGIONAL PERSONNEL OFFICER, YORKSHIRE REGIONAL HEALTH AUTHORITY, PARK PARADE, HARROGATE, NORTH YORKSHIRE.

Please quote appropriate reference number. Closing date for all posts 10TH DECEMBER, 1980.

(3562)

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(3560)

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Please write or telephone Mr. J. Pardy, Personnel Manager, Sterling Health, Winthrop House, Surbiton, Surrey. Tel. 01-399 5252.

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